Nos. 2014-1602, -1603, -1604, -1605, -1606, -1607

UNITED STATES COURT OF APPEALS FOR THE FEDERAL CIRCUIT

PERSONALWEB TECHNOLOGIES, LLC,

Appellant,

v.

EMC CORPORATION AND VMWARE INC.,

Appellees.

Appeals from the United States Patent and Trademark Office, Patent Trial and Appeal Board in Nos. IPR2013-00082, IPR2013-00083, IPR2013-00084, IPR2013-00085, IPR2013-00086 and IPR2013-00087

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CERTIFICATE OF INTEREST

Counsel for Appellees EMC Corporation and VMware, Inc. certify the following:

1. The full name of every party or *amicus* represented by us is:

EMC Corporation and VMware, Inc.

2. The names of the real parties in interest represented by us are:

EMC Corporation and VMware, Inc.

3. All parent corporations and any publicly held companies that own 10 percent or more of the stock of the parties or amicus curiae represented by me are:

EMC Corporation has no parent corporation and no publicly held corporation owns 10% or more of its stock. EMC Corporation owns more than 10 percent of the stock of VMware, Inc. No other companies own 10 percent or more of the stock of VMware, Inc.

4. The names of all law firms and the partners or associates that appeared for the parties or amicus now represented by me in the trial court or agency or are expected to appear in this court are:

WILMER CUTLER PICKERING HALE AND DORR LLP: William F. Lee, Cynthia D. Vreeland, David L. Cavanaugh, Peter M. Dichiara, Mark C. Fleming, Robert M. Galvin, Anna E. Lumelsky, and Arthur W. Coviello.

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Dated: February 27, 2015

/s/ William F. Lee
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TABLE OF CONTENTS

TABLE OF AUTHORITIES

CASES

Page(s)

STATUTES AND REGULATIONS

STATEMENT OF RELATED CASES

No appeal in these proceedings was previously before this Court or any other court. Appellant PersonalWeb Technologies, LLC ("PersonalWeb") has asserted the patents-at-issue against numerous defendants. Accordingly, the following cases may be directly affected by this Court's decision in these consolidated appeals:

- *PersonalWeb Techs. LLC v. EMC Corp.*, No. 5-13-cv-1358 (N.D. Cal.);
- *PersonalWeb Techs. LLC v. Facebook Inc.*, No. 5-13-cv-1356 (N.D. Cal.);
- *PersonalWeb Techs. LLC v. NetApp, Inc.*, No. 5-13-cv-1359 (N.D. Cal.);
- *PersonalWeb Techs. LLC v. Google, Inc.*, No. 5-13-cv-1317 (N.D. Cal.);
- *PersonalWeb Techs. LLC v. Int'l Bus. Mach. Corp.*, No. 6-12-cv-661 (E.D. Tex.);
- *PersonalWeb Techs. LLC v. GitHub Inc.*, No. 6-12-cv-659 (E.D. Tex.); and
- *PersonalWeb Techs. LLC v. Apple Inc.*, No. 6-12-cv-660 (N.D. Cal.).

Counsel for Appellees EMC Corporation and VMware Inc. (together "EMC") are unaware of any other cases pending in this or any other forum that will directly affect or be directly affected by this Court's decision in these consolidated appeals.

INTRODUCTION

The inventors of the patents-at-issue claimed in their patent applications that they were the first to design a data-processing system that identified files based not on each file's location in a file system, but instead based on each file's content (using so-called "content-based" identifiers). They were wrong. The use of content-based identifiers long predated the patents, and multiple prior art systems used the same types of identifiers for the same purposes.

In its six decisions cancelling all challenged claims of the patents, the Patent Trial and Appeal Board ("Board") provided detailed analyses of the patents and the prior art and set out numerous factual findings that support its conclusions of anticipation and obviousness. The Board also made credibility determinations, repeatedly finding that the testimony of EMC's expert was convincing and consistent with the prior art, while the testimony of PersonalWeb's expert was not.

On appeal, instead of showing any error in the Board's careful analysis, PersonalWeb presents an abstract and confusing brief that is not organized by patent or claim. PersonalWeb's jumbled presentation is not accidental: PersonalWeb avoids the Board's claim-by-claim analysis because that analysis makes clear that each and every claim covers matter that was disclosed in the prior art or is obvious in light of it. Indeed, although PersonalWeb suggests in its Statement of the Case that the supposed novelty of the patents was their use of

content-based identifiers, none of its substantive arguments asserts that the prior art lacked this feature.

PersonalWeb's arguments provide no basis for overturning the Board's findings. Instead, it repeatedly attempts to circumvent the substantial evidence standard of review, for example, by accusing the Board of considering "hypothetical embodiments" (Br.65) and by asserting that the Board "rewrote" a claim construction (Br.40). These arguments are nothing more than disagreements with the Board's conclusions regarding the content of the prior art and what it discloses to a skilled artisan—factual findings reviewed for substantial evidence, which PersonalWeb cannot convert into legal issues through sleight-of-hand. Moreover, PersonalWeb makes no separate challenge to the Board's conclusions on obviousness, apart from a hollow assertion that the Board inadequately articulated its application of the *Graham* factors. In fact, the Board expressly recited the *Graham* factors and properly applied them to the evidence.

PersonalWeb's true objection appears to be that it simply does not like the *inter partes* review ("IPR") procedure created by the America Invents Act—a dissatisfaction that surfaces in its irresponsible accusation that Congress "incentivize[d]" the Board to abdicate its statutory responsibility to consider the merits of the parties' dispute and to become "an advocate for its initial

determination to grant an IPR." Br.3. PersonalWeb's unfounded objection should be directed to Congress, not this Court.

The Board carefully weighed the patents, the lengthy prior art disclosures, the declarations and testimony of the experts, and the parties' arguments. The Board's decisions are thorough and well-reasoned, are supported by substantial evidence, are correct under any standard, and should be affirmed.

STATEMENT OF ISSUES

A. Appeal No. 14-1602 (U.S. Patent No. 5,978,791 ("'791 patent"), claims 1-4, 29-33, and 41 (*see* A2559-2562))

1. Whether the Board correctly construed "identity means."
2. Whether substantial evidence supports the Board's finding that Woodhill discloses the "existence means" limitation of the challenged claims.
3. Whether substantial evidence supports the Board's finding that Woodhill anticipates claims 1-4, 29-33, and 41 of the '791 patent.
4. Whether substantial evidence supports the Board's application of the *Graham* factors in finding that Woodhill renders claims 1-4 and 29 of the '791 patent obvious.

B. Appeal No. 14-1603 (U.S. Patent No. 6,415,280 ("'280 patent"), claims 36 and 38 (*see* A6989))

5. Whether substantial evidence supports the Board's finding that Woodhill anticipates claims 36 and 38 of the '280 patent.

6. Whether substantial evidence supports the Board's application of the *Graham* factors in finding that Woodhill renders claims 36 and 38 of the '280 patent obvious.

C. Appeal No. 14-1604 (U.S. Patent No. 7,945,544 ("'544 patent"), claim 1 (*see* A11157-11158))

7. Whether substantial evidence supports the Board's finding that Woodhill anticipates claim 1 of the '544 patent.

8. Whether substantial evidence supports the Board's finding that Kantor anticipates claim 1 of the '544 patent.

9. Whether substantial evidence supports the Board's application of the *Graham* factors in finding that Woodhill and Kantor render claim 1 of the '544 patent obvious.

D. Appeal No. 14-1605 (U.S. Patent No. 7,945,539 ("'539 patent"), claims 10, 21, and 34 (*see* A15848-15850))

10. Whether substantial evidence supports the Board's findings that Langer anticipates claims 10 and 21 of the '539 patent and that Langer and Kantor render claim 34 of the '539 patent obvious.

11. Whether substantial evidence supports the Board's application of the *Graham* factors in finding that the claims 10, 21, and 34 are obvious on multiple independent grounds.

E. Appeal No. 14-1607 (U.S. Patent No. 8,001,096 ("'096 patent"), claims 1, 2, 81, and 83 (*see* A25196-25197; A25199-25200))

12. Whether the Board correctly rejected PersonalWeb's attempt to construe "sequence of non-overlapping parts" to add a requirement that the sequences not have "intervening" parts, where PersonalWeb's construction is contrary to the specification and the evidence.

13. Whether substantial evidence supports the Board's application of the *Graham* factors in finding that Kantor and Satyanarayanan render claims 1, 2, 81, and 83 of the '096 patent obvious.

F. Appeal No. 14-1606 (U.S. Patent No. 7,949,662 ("'662 patent"), claim 30 (*see* A20980))

14. Whether substantial evidence supports the Board's application of the *Graham* factors in finding that Kantor and Satyanarayanan render claim 30 of the '662 patent obvious.

STATEMENT OF THE CASE

In December 2012, EMC petitioned for *inter partes* review of various claims in the six patents-at-issue, all of which PersonalWeb had asserted against EMC in litigation. Each petition was supported by an expert declaration by Dr. Douglas W. Clark, a professor of computer science at Princeton University.

On May 17, 2013, the Board instituted IPR proceedings for all challenged claims. PersonalWeb filed patent owner responses to EMC's petitions, along with

declarations by its own expert, Dr. Robert Dewar. EMC filed reply briefs and additional reply declarations by Dr. Clark. Both parties' experts were deposed and their testimony was considered by the Board. The Board also held a hearing to consider the parties' arguments and evidence.

On May 15, 2014, the Board issued six decisions cancelling all challenged claims. A36-510. This Court consolidated PersonalWeb's appeals.

STATEMENT OF FACTS

A. Data-Processing Systems

This case involves data-processing technology and, in particular, techniques for identifying and managing digital data items such as electronic documents and files. There are many well-known techniques for identifying data items within a system. One such method, familiar to many personal computer users, employs "path names," which identify a file by describing the path through the file system that leads to the particular file (*e.g.*, C:\MyDocuments\Finances\Budget.doc). A12184(Deutsch); A12392(Clark); A7052(Kantor). Path names are referred to in the patents-at-issue as "context"-based identifiers, meaning that they identify a file based on a particular context (*i.e.*, a location) within the system. A2540(2:5-7).

The prior art also disclosed other ways of identifying data items, however, including methods that were not context-based, but ***content***-based. By at least the early 1980s, researchers had begun identifying data items with high reliability

using short strings of numbers (or codes) called "hashes"—often also referred to as digital "signatures," "fingerprints," or "message digests." *See*, *e.g.*, A7427(McGregor); A7396(Kaliski); A7353(Zimmerman).

A hash is a unique identifier for a data item obtained by applying a mathematical algorithm, known as a "hash function," to the contents of the data item. A7396(Kaliski); A7363(Knott). Hash functions—used by IBM at least as early as the 1950s—are designed to create, for a data item of any length, a hash that is unique to that data item, or at least sufficiently distinctive that the chances of two different data items having the same hash are vanishingly small. A7396(Kaliski); A7364(Knott) (discussing history of hashing). One well-known hash function, for example, is the "MD5" hash function, developed in the 1990s by Professor Ron Rivest of MIT, which can be used to create digital signatures of files for security applications (*e.g.*, applications that confirm that a file is what it purports to be). A7369-7389(Rivest-MD5).

The prior art also disclosed creating hashes for larger or compound data items by dividing the data item into parts, hashing each part, and then hashing the hashes of the parts (known as a "hash of hashes"). A16771(7:66-8:31); A16763(Fischer); A7033(Kantor); A25552(Clark). Using a hash of hashes for larger or compound files was a well-known, efficient technique for creating hashes for such files. A16199-16170(Clark).

Long before the 1995 priority date of the patents-at-issue, data-processing systems used these content-based identifiers (including hashes and "hashes of hashes") for a variety of data-management applications. For example, at least sixteen years before the priority date of PersonalWeb's patents, it was known to use content-based identifiers produced by hash functions to identify and eliminate duplicate records, thus saving storage space. *See, e.g.*, A12005-12008(Babb); A12034-12035(Bitton). By the early 1990s, the application of hash-based identifiers to file-management functions was so well known that at least one prior art commentator not only described such applications as "easy," but also posted them publicly "to impede anyone who might independently have had the idea from patenting it." A12054(Williams).

B. Prior Art References

The Board's decisions in this case turn on three primary prior art references—Woodhill (A7251-7277),[1] Kantor (A7004-7250),[2] and Langer (A6998-7003)[3]—each of which disclosed systems for using content-based identifiers for the same file-management functions as the patents-at-issue. The

[1] James R. Woodhill et al., System and Method For Distributed Storage Management on Networked Computer Systems Using Binary Object Identifiers, U.S. Patent No. 5,649,196 (filed Nov. 9, 1995).

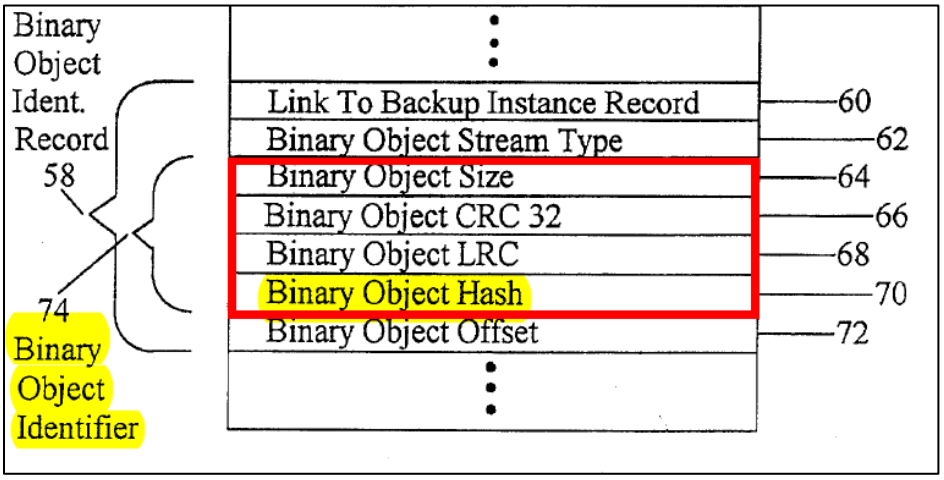
[2] Frederick W. Kantor, *FWKCS™ Contents-Signature System, Version 1.22* (1993).

[3] Albert Langer, "Re: dl/describe (File descriptions)," post to the "alt.sources" newsgroup (Aug. 7, 1991).

Board also cited two secondary references—Fischer (A16763-16775)[4] and Satyanarayanan (A21551-21563).[5] PersonalWeb does not dispute on appeal that these references are prior art to the challenged patents.

1. Woodhill

Woodhill discloses a distributed storage system that identifies data items (which it calls "binary objects" or "BOBs") using content-based identifiers (which it calls "Binary Object Identifiers" or "BOBIDs"). As Woodhill explains, a "Binary Object Identifier … is a unique identifier for each binary object to be backed up." A7267(4:45-47). Figure 3 of Woodhill shows the elements of the Binary Object Identifier, including a "Binary Object Hash" and a Binary Object Size (*i.e.*, length):



[4] Addison M. Fischer, Method for Protecting a Volatile File Using a Single Hash, U.S. Patent No. 5,475,826 (Nov. 19, 1993).

[5] Mahadev Satyanarayanan et al., *Coda: A Highly Available File System for a Distributed Workstation Environment*, 39 IEEE Transactions On Computers 447 (1990).

A7254(Fig.3). The Binary Object Hash is calculated by applying a hash algorithm to "the contents of the binary object." A7269(8:22-32). The hash value and length value are both a function of the data contained in the file. A7269(8:22-32).

Woodhill also discloses a technique for backing up larger files, which it calls a "granularization technique." A7272(14:52). Woodhill divides the files into smaller segments or "granules" and calculates a contents identifier for each granule by applying a hash function to the granule. A7273(15:9-45).

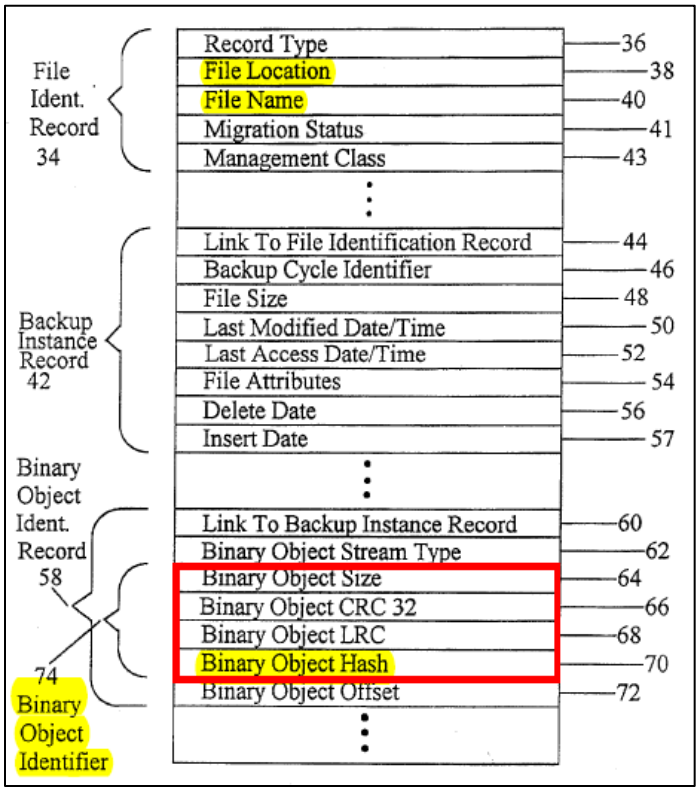
Importantly here, Woodhill explains that the "key notion" of his Binary Object Identifier is that it is calculated using ***all*** the contents of the binary object and ***only*** those contents:

> Although a Binary Object Identifier 74 may be calculated in various ways, ***the key notion is that the Binary Object Identifier is calculated from the contents of the data instead of from an external and arbitrary source***.

A7269(8:38-42).[6] The identifier thus changes when and only when the content of the data item changes. A7269(8:58-62) ("The critical feature to be recognized in creating a Binary Object Identifier 74 is that the identifier should be based on the contents of the binary object so that the Binary Object Identifier 74 changes when the contents of the binary object changes."); A2919(¶84); *see also* A7269(8:63-65) ("[D]uplicate binary objects…can be recognized from their identical Binary Object Identifiers 74.").

[6] All emphasis in this brief is added unless otherwise noted.

Woodhill uses its content-based Binary Object Identifiers for basic file-management purposes, including the same purposes as the patents-at-issue. For example, Woodhill's "Distributed Storage Manager" (described as a "backup/restore system") uses the identifiers to identify binary objects that have changed since the system's most recent backup. A7266(2:39-46); A7268-7270(5:12-10:44). As illustrated in Figure 3 of Woodhill, a "File Database" stores information for each file that has been backed up on the system, including the file name and location, and the Binary Object Identifier for each binary object in the file:



A7254(Fig.3); A7267(3:45-4:47).

As part of the backup procedure, the Distributed Storage Manager determines whether any part of a file has changed by comparing the Binary Object Identifier for each part of the file with the Binary Object Identifier for a recently backed-up version of that part. A7270(9:6-14). It then backs up only the parts that have changed. A7251(Abstract); A7266(2:30-38); A7270(9:7-22). Woodhill's Distributed Storage Manager also has an auditing procedure that uses the Binary Object Identifiers "to perform self-audits … to ensure that [data that has] been backed up can be restored." A7274(18:11-38); A7270(10:32-34). More generally, Woodhill uses the identifiers to identify duplicate binary objects in the system, emphasizing that "duplicate binary objects, even if resident on different types of computers in a heterogeneous network, can be recognized from their identical Binary Object Identifiers." A7269(8:62-65).

2. Kantor

Kantor also describes a prior art file-management system that employs content-based identifiers (which Kantor calls "contents signatures") for use in a bulletin board system, an online system considered a precursor to the World Wide Web. A7008(Kantor). These contents signatures are used, for example, to determine if a file is already present on the system, and to identify and eliminate duplicates:

> By means of "contents_signatures", [Kantor] automatically compares all the files in a newly received standard zipfile … with all the files in

> all the standard zipfiles on an entire electronic bulletin board … [and] is used to prevent wasteful duplication, and to protect against unwanted files.

A7009.

Kantor, like Woodhill, bases these "contents signatures" on a hash function of the entire contents of a file and only those contents, combined with bits indicating the length of the file. A7030-7031(Kantor); A16181(¶¶34-35). Kantor explains that its "contents signatures" thus provide substantially unique identifiers for each unique file in the system:

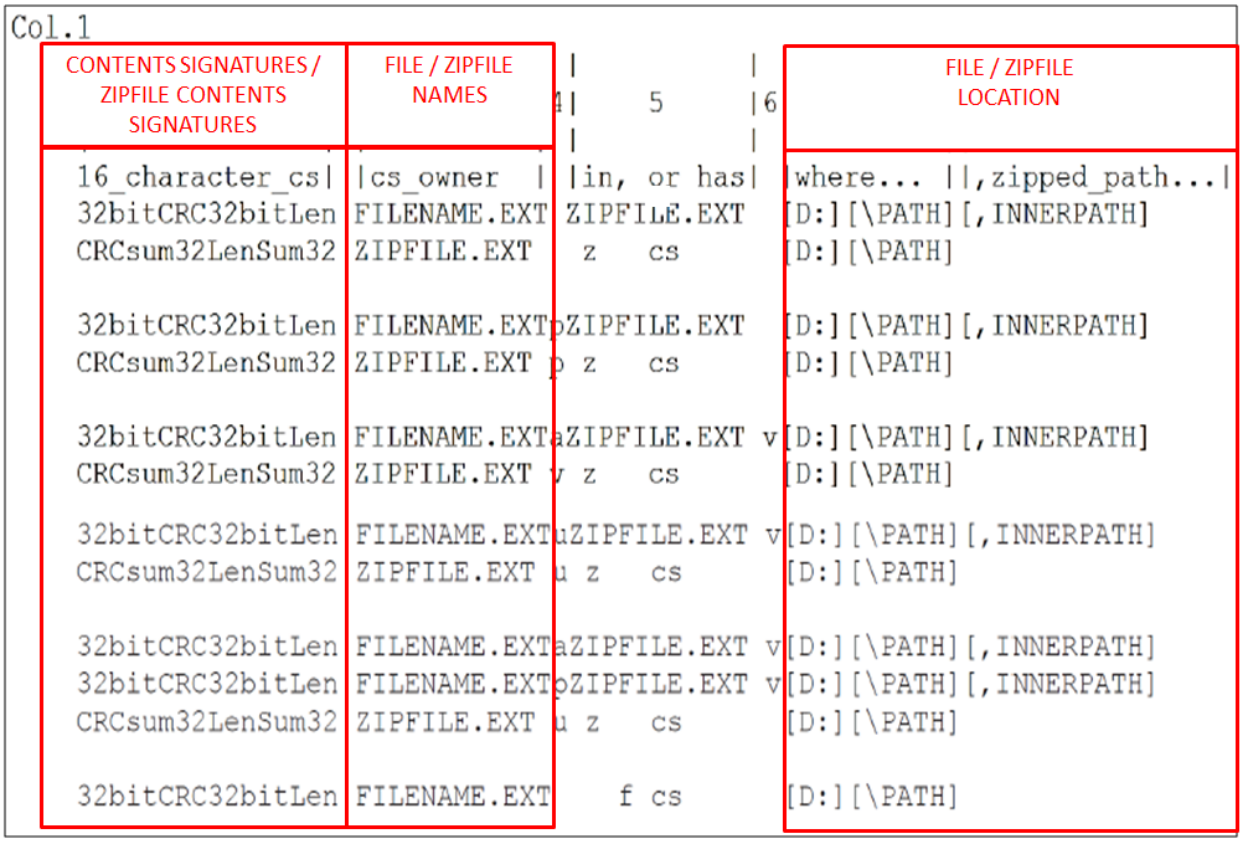
> A "contents signature" is a string of bits generated from the contents of a file, long enough and suitably generated so as to provide some ***desirably low probability that two different files would give rise to the identical string of bits***.

A7030.

Kantor also describes creating substantially unique identifiers for larger "zipfiles"—files that themselves contain a set of one or more smaller files called "inner files." A7009; A7033. Kantor computes a zipfile's identifier (which Kantor calls a "zipfile contents signature") based on a "hash of hashes." A7033. Specifically, the zipfile contents signature is created based on a hash of the contents signatures of the inner files (a "hash of hashes"), along with bits representing the total length of the inner files. A7033.[7]

[7] Kantor performs the "hash of hashes" using a well-known hash function called "addition modulo." *See* A7033; A25552(Clark).

Kantor—like Woodhill—uses these substantially unique contents signatures for basic file-management purposes, such as to identify whether a file is present on the system before uploading it (A7120), to eliminate duplicates (A7009), and to access specific files (A7120-7121; A7197). Kantor stores contents signatures and zipfile contents signatures for all files and zipfiles in the system and also stores their respective locations (path names) in a master list called CSLIST.SRT, shown below:



A7076-7077 (red annotations added); A7042 ("CSLIST.SRT is the main list of 'contents_signatures.'"). The CSLIST serves both to help identify duplicates so that they can be deleted, and also to allow bulletin board users to "look up" a

specific file to determine whether it already exists in the system before uploading it. A7120 ("[A] person can ask ahead to find out if material which he/she is thinking of uploading is already on a [bulletin board system]."); A7009 (the system uses "zipfile contents signature[s]" to "recognize[] as redundant a zipfile made of pieces scattered in many different zipfiles on the system … [and] prevent wasteful duplication"); A7042 (describing use of signatures for "system housekeeping"); A7197. EMC's expert Dr. Clark also explained that a person of ordinary skill could use Kantor's "look up" feature to access particular files using their contents signatures. A25549-25550; A7120-7121; A7197.

3. Langer

Like Woodhill and Kantor, Langer also sought to address the problem of "uniquely identifying files which may have different names and/or be in different directories on different systems." A7000(Langer). Langer's solution, like Woodhill's and Kantor's, was to "provide a unique identifier for each file which is independent of location." A7000. Langer bases these unique identifiers on the entire contents of the file and only those contents:

> A simple method of defining a unique identifier that does NOT include a particular site identifier would be to ***use a hash function on the entire contents of the file***.

A7001; A16177-16178(¶28). Langer also specifically discloses "using a cryptographic hash function such as MD5" (A7001)—one of the hash functions discussed in PersonalWeb's patents-at-issue (A2546(13:15-19)).

Langer also discloses creating substantially unique identifiers for compound data items, such as archived files that are part of the same package or zipfile, by performing a "hash of hashes." A7002. Langer explains that each file within a zipfile can be hashed, the resulting hash codes can be concatenated into a block of codes, and then the same hash function can be applied again "to the concatenation of the codes." A7002 ("Likewise the [hash] code for a … [zipfile] … could be the code obtained by applying MD5 again to the concatenation of the codes ….").

Langer further discloses that these identifiers can be used for the same file-management purposes as the identifiers in the patents-at-issue. A7001. For example, Langer discloses using a central database called "archie" that contains the MD5 identifier and the location for each file. A7001; A26227. A user could determine if a particular file existed in the system by referring to this archie database. A7001; A2901-2903(¶¶44-47). A user also could use an MD5 code to access a particular file by sending a query containing the MD5 code to the archie database. A7000-7001; A2906-2907(Clark); A15391 (PersonalWeb conceding that Langer discloses accessing a file using an MD5 code). A user further could use the identifier for a package or zipfile (*i.e.*, the "hash of hashes") to obtain the

identifiers for the files within the package, and then could use the identifier for one of the individual files to retrieve a file of interest. A7000-7004.

4. Fischer and Satyanarayanan

Fischer provides another example of a system that uses a "hash of hashes." Fischer discloses building a "fileHash" value for a database file containing multiple records by applying a hash algorithm to the data of each record in the file, and then applying a hash algorithm to those combined hashes, thereby creating the aggregate "fileHash" (*i.e.*, a "hash of hashes"). A16771(7:66-8:31); A16763(Abstract).

Satyanarayanan discloses a system to improve file availability by maintaining multiple "mirrored" copies of each file on a network. A21551-21552. Satyanarayanan also discloses using "unique" identifiers for each data object. A21554 ("Each file … has a unique low-level file *identifier* (FID) …." (emphasis in original)).

C. The Patents-At-Issue

The six patents-at-issue reflect an effort to claim for the patentees' own benefit various data-processing concepts that were well-known for decades before the 1995 priority date of the earliest patents-at-issue. The patentees' strategy depended on the outlandish claim—made in the specification itself—that they were the first to invent the use of content-based identifiers for data items:

> In ***all*** of the prior data processing systems the names or identifiers provided to identify data items … are ***always*** defined relative to a specific context.
>
> …
>
> In prior art systems for identifying data items there is ***no*** direct relationship between the data names and the data item.

A2540(1:65-2:13). The patentees similarly argued during prosecution that they were the first to use data identifiers based on "all" the data and "only" the data in a data item. A3242-3243.

However, as the overwhelming evidence of record demonstrates and the Board correctly found, the patentees' statements decidedly misstated the prior art. In fact, the patents claim concepts and implementations that were already well-understood, fully disclosed, and in use.

The patents-at-issue, which share the same specification, purport to claim data-processing systems that create "substantially unique identifiers" for "data items" in order to perform basic file-management functions. A2541(3:29-4:41).[8] The patents refer to the claimed identifiers as "True Names." A2542(6:6-10).

The patents envision creating a True Name by applying a hash function to all the data in a particular data item and only that data. *See, e.g.*, A2545(12:55-60); A2507(Abstract); A2559(39:16-19). The hash functions described in the patents—like all hash functions—reduce the contents of the data item to "a relatively small,

[8] For convenience, this brief cites to the '791 specification.

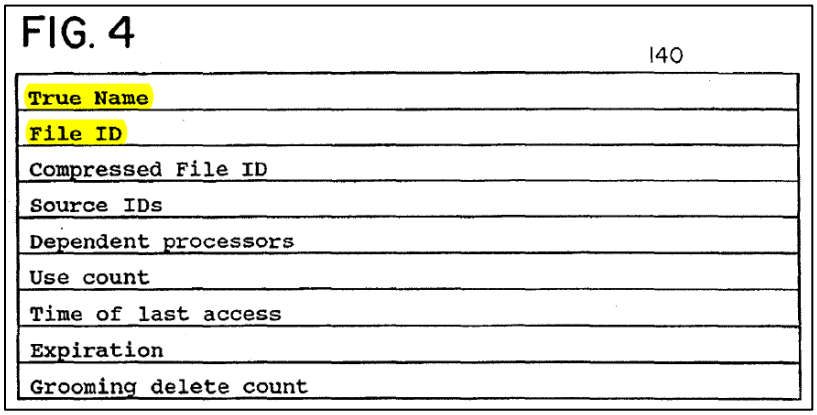
fixed size identifier," so that the identifier is "virtually guaranteed to represent the data [item] and only [the] data [item]." A2545(12:55-60). As a result, identical data items will have the same True Name, and different data items will have different True Names. A2545(12:55-60).

For smaller data items, the patents compute the True Name by hashing the contents of the data item and then—like Woodhill and Kantor—appending additional bits representing the length of the data item. A2546(14:4-12). The patents recognize that hash functions (also known as "message digest" or MD functions) were known in the art, and confirm that the hash can be performed with MD4, MD5, or SHA functions, or with other hash functions that provide "lower probabilities of uniqueness." A2545-2546(12:54-13:54).

For larger "compound" data items (A2542(5:50-52)), the patents assert that it may be preferable to apply a hash function to "segments" of the data item, combine the hashes together into an "indirect block," and then apply another hash function to the indirect block (*i.e.*, to create a "hash of hashes"). A2546(14:13-39); A199; A24565; A24575. This "hash of hashes" is once again combined with bits representing the length of the compound data item to form the True Name for the compound data item. A2546(14:25-31).

The patents-at-issue—like Woodhill, Kantor, and Langer—use these True Names for "standard" file-management functions. A2542(6:14-19). For example,

a "True File Registry" stores a list of each data item, its True Name, and its location (or pathname) within the system, called the "File ID," as illustrated in Figure 4:



A2512(Fig.4); A2543(8:27-34); A2544(9:36-10:10).

The True Names are used for the same data-management purposes as the prior art content-based identifiers, including locating data items (A2541(3:36-39)), accessing data items (A2541(3:54-56)), performing backups (A2557(36:42-55)), restoring data items that have been lost or destroyed (A2557(36:50-52)), eliminating duplicate data items (A2553(28:23-26)), and checking whether a particular data item is already in the system before uploading another copy (A2546(14:40-50)).

As should be plain, the data-processing concepts at the heart of the patents-at-issue are thus identical to the concepts used in the prior art, except with different names:

Woodhill	Kantor	Langer	Patents-At-Issue
Binary object	File	File	Data item
Granularized binary object	A collection of files in a zipfile	A collection of files in a zipfile	Compound data item
Granule	A file contained in the zipfile ("inner file")	A file contained in the zipfile ("inner file")	Segment
Binary object identifier (BOBID)	Contents signature Zipfile contents signature	MD5 hash	True Name
File Database	CSLIST	archie database	True File Registry

D. The Board's Decisions

The Board's decisions—which range from 40 to 80 pages in length, depending on the number of instituted grounds—provide a detailed analysis of the bases for the Board's findings on a claim-by-claim and element-by-element basis. In reaching its decisions, the Board considered EMC's Petitions, PersonalWeb's Preliminary Responses and Patent Owner Responses, EMC's Reply Briefs, the expert declarations and deposition testimony from EMC's and PersonalWeb's experts, and numerous prior art references. The Board construed the claims, evaluated the voluminous record, weighed the expert opinions, and consistently credited the testimony of EMC's expert, Dr. Clark, over the testimony of PersonalWeb's expert, Dr. Dewar. *See, e.g.*, A202 ("Upon reviewing the evidence

on record, we credit the testimony of Dr. Clark over that of Dr. Dewar. We find that Dr. Clark's explanations are consistent with Woodhill. On the other hand, Dr. Dewar's testimony … contradicts the disclosure of Woodhill." (citations omitted)); *see also* A56; A61; A63; A65; A68; A74; A83; A128; A132; A144; A207; A225; A309; A326; A332; A339; A397; A466; A467-468; A469-470; A474; A477-478; A505; A507; A508. The Board also repeatedly found that PersonalWeb's arguments were contrary to the express disclosures of the prior art references. *See, e.g.*, A205 ("EMC responds that 'PersonalWeb's assumptions about Woodhill are directly contradictory to Woodhill's explicit disclosure.' We agree with EMC." (citation omitted)); A221 ("PersonalWeb … ignores Kantor's other steps for determining a zip-file contents signature …."); A308 ("PersonalWeb's argument and expert testimony contradict Langer's explicit disclosure."); *see also, e.g.*, A78; A99; A202; A211; A219; A296-297; A406; A484-485.

For ease of reference, EMC's Argument section for each patent-at-issue begins with a summary of the challenged claims and the Board's findings. The following chart also provides a summary of the cancelled patent claims, the Board's grounds for cancelling those claims, and the issues on appeal:

Cancelled Claims	Board Grounds For Cancellation	PersonalWeb Arguments On Appeal
'791 patent claims 1-4, 29-33, 41	• Claims 1-4, 29-33, and 41: anticipated by Woodhill • Claims 1-4 and 29: obvious over Woodhill	• Construction of "identity means" • Whether the Board re-construed "existence means" • Whether Woodhill discloses "accessing a data item … using the identifier of the data item" • Whether Woodhill discloses "determining" whether a data item is present at a "location" and, if it is "not present," transmitting or fetching it • Whether Woodhill discloses "accessing a data item" and "determining … and … fetching" • Whether the Board adequately articulated its obviousness determination
'280 patent claims 36, 38	• Claims 36 and 38: anticipated by Woodhill • Claims 36 and 38: obvious over Woodhill	• Whether Woodhill discloses "providing the data file to the client" • Whether the Board adequately articulated its obviousness determination
'544 patent, claim 1	• Claim 1: anticipated by Woodhill • Claim 1: anticipated by Kantor	• Whether Woodhill discloses "applying a second function to the part values" (*i.e.*, a hash of hashes) • Whether Kantor discloses "applying a first function to each part of said

Cancelled Claims	Board Grounds For Cancellation	PersonalWeb Arguments On Appeal
	• Claim 1: obvious over Woodhill and Kantor	first plurality of parts" • Whether the Board adequately articulated its obviousness determination
'539 patent, claims 10, 21, 34	• Claims 10 and 21: anticipated by Langer • Claims 10 and 21: obvious over Kantor • Claims 10 and 21: obvious over Woodhill and Fischer • Claim 34: obvious over Langer and Woodhill • Claim 34: obvious over Langer and Kantor	• Whether Langer discloses "using said particular segment identifier to request said corresponding particular segment" • Whether the Board adequately articulated its obviousness determination
'096 patent, claims 1, 2, 81, 83	• Claims 1, 2, 81, 83: obvious over Kantor and Satyanarayanan	• Whether Kantor discloses "a data item consisting of a sequence of non-overlapping parts" • Whether the Board adequately articulated its obviousness determination
'662 patent, claim 30	• Claim 30: obvious over Kantor and Satyanarayanan	• Whether the Board adequately articulated its obviousness determination

SUMMARY OF THE ARGUMENT

PersonalWeb structures its arguments in a confusing and counterintuitive way, shuffling patents, claims, and elements across various sections of its brief. PersonalWeb's strategy makes orderly review of the Board's six thorough and systematic decisions difficult. We address the relevant issues patent by patent, and claim element by claim element, consistent with the Board's decisions and this Court's standard practice.

The '791 Patent

Based on a careful analysis of the evidence and weighing the credibility of the experts, the Board held that Woodhill anticipates or renders obvious claims 1-4, 29-33 and 41 of the '791 patent. That conclusion is correct and supported by substantial evidence.

PersonalWeb's challenges to the Board's construction of the structure for the "identity means" of claim 1 lack merit. Contrary to PersonalWeb's argument, the Board was not required to include specific citations to the specification in its construction. And none of the portions of the specification that PersonalWeb attempts to read into the construction is ***necessary*** to the claimed function. Moreover, even if PersonalWeb were correct, any error is harmless in light of the Board's alternative finding that it would have been obvious to combine Woodhill

with an MD5 hash—the same "identity means" used in one of the preferred embodiments.

PersonalWeb's remaining arguments relating to anticipation are all disagreements with the Board's factual findings, but PersonalWeb erroneously attempts to characterize them as legal arguments. PersonalWeb asserts, for example, that the Board "rewrote" its original construction of the corresponding function for the "existence means" of claim 1. But the Board did not "rewrite" anything; the Board simply made the factual finding that Woodhill performs the "existence means" function even though it does not search "all" files in the system. Indeed, PersonalWeb's ***own expert*** agreed that its argument to the contrary was inconsistent with the '791 embodiments. *See infra* p. 40.

Similarly, PersonalWeb argues that the Board credited "hypothetical embodiments" contrary to *Therasense, Inc. v. Becton, Dickinson & Co.*, 593 F.3d 1325, 1333 (Fed. Cir. 2010), and improperly combined disclosures contrary to *Net MoneyIN, Inc. v. VeriSign, Inc.*, 545 F.3d 1359 (Fed. Cir. 2008). These are nothing more than disagreements with the Board's factual conclusions that Woodhill discloses the claimed subject matter. Contrary to PersonalWeb's arguments, the Board's findings are supported by substantial evidence—including Woodhill's express disclosures and the testimony of Dr. Clark, whom the Board repeatedly

credited over PersonalWeb's expert. The Board's findings are correct under any standard, and should be upheld.

PersonalWeb does not make any distinct substantive obviousness argument, but asserts that the Board's discussion of each *Graham* factor was inadequate. That formalistic argument is meritless. The Board presented a careful analysis of each factor that more than satisfied the relevant requirements.

The '280 Patent

Substantial evidence supports the Board's findings that claims 36 and 38 of the '280 patent are anticipated or obvious based on Woodhill. The Board again carefully weighed Woodhill's relevant disclosures and credited the testimony of EMC's expert.

PersonalWeb raises only a single cryptic challenge to the Board's anticipation determination, arguing—with no explanation—that its "hypothetical embodiments" argument for the '791 patent also applies to the '280 patent. Such a perfunctory assertion is inadequate to preserve an appellate argument. Regardless, PersonalWeb's argument fails for the same reasons as for the '791 patent.

PersonalWeb also repeats its argument regarding the *Graham* obviousness factors, which likewise fails for the same reasons as for the '791 patent.

The ’544 Patent

Substantial evidence supports the Board’s findings that Woodhill and Kantor each separately anticipate claim 1 of the ’544 patent, and that the claim is also obvious based on the combination of Woodhill and Kantor. As with the ’791 and ’280 patents, the Board carefully analyzed the relevant disclosures, and repeatedly credited the testimony of EMC’s expert over PersonalWeb’s expert.

PersonalWeb again couches factual disputes regarding anticipation as legal arguments, recycling its *Net MoneyIN* and “hypothetical embodiments” arguments. These arguments are meritless for the same reasons as for the ’791 patent. PersonalWeb also again repeats its argument regarding the *Graham* factors, which fails for the same reasons noted above.

The ’539 Patent

Substantial evidence supports the Board’s findings that the challenged ’539 patent claims are invalid on multiple grounds. The Board correctly found that: (1) claims 10 and 21 are anticipated by Langer, and claim 34 is obvious over Langer and Woodhill; (2) claims 10 and 21 are obvious over Kantor, and claim 34 is obvious over Kantor and Langer; and (3) claims 10 and 21 are obvious over Woodhill and Fischer.

PersonalWeb contends, once again, that the Board improperly combined separate and distinct embodiments in Langer contrary to *Net MoneyIN*. However,

substantial evidence supports the Board's finding that Langer does not disclose alternative embodiments, but rather discloses the "overall concept" of using "unique identifiers" for files, and then builds upon that concept for the "related problem" of "packages" of files. The Board therefore properly considered the Langer reference as a whole.

PersonalWeb also repeats its argument concerning the *Graham* factors. Substantial evidence supports the Board's consideration of all four of the *Graham* factors. PersonalWeb's argument ignores the Board's extensive analysis, and fails for the same reasons as for the other patents.

The '096 Patent

Substantial evidence supports the Board's findings that '096 patent claims 1, 2, 81, and 83 are obvious based on Kantor and Satyanarayanan. The primary dispute on appeal is whether the relevant "data item" in Kantor is the entire zipfile including the metadata (as PersonalWeb argued), or instead is simply the content portion of the zipfile consisting of the inner files (as the Board correctly found). PersonalWeb contends that the Board incorrectly construed the "data item" limitation of the '096 patent claims. PersonalWeb's proposed construction of the "data item" limitation, however, was contrary to its agreed-to construction of "data item," contrary to the lexicography in the patent (*i.e.*, that a data item can be a "portion" of a file), contrary to the plain meaning of "sequence" as confirmed by

Dr. Clark, and contrary to the express purpose of the claimed invention, which was to create identifiers based ***only*** on the ***contents*** of a file (not the associated metadata).

Regarding obviousness, PersonalWeb is once again incorrect that the Board's articulation of its obviousness analysis regarding the '096 patent was somehow inadequate.

The '662 Patent

Substantial evidence supports the Board's finding that claim 30 of the '662 patent is obvious based on Kantor and Satyanarayanan. PersonalWeb's only argument regarding the '662 patent is, again, that the Board did not adequately articulate its analysis of the *Graham* factors. PersonalWeb's argument fails for the same reasons as for the other patents.

The Board's decisions should be affirmed.

ARGUMENT

I. STANDARD OF REVIEW

This Court reviews the Board's legal determinations *de novo*, and its factual findings for substantial evidence. *In re Roslin Institute (Edinburgh)*, 750 F.3d 1333, 1335 (Fed. Cir. 2014); *In re Gartside*, 203 F.3d 1305, 1320 (Fed. Cir. 2000). Claim construction is a legal issue reviewed *de novo*, based on underlying fact findings which are reviewed for clear error. *Teva Pharms. USA, Inc. v. Sandoz,*

Inc., 135 S. Ct. 831, 837-838 (2015). Because this is an appeal from the Patent Office, the issue to be reviewed is whether the Board properly applied the "broadest reasonable interpretation" standard. *In re Cuozzo Speed Techs., LLC*, __ F.3d __, 2015 WL 448667, at *19 (Fed. Cir. Feb. 4, 2015) (holding that the broadest reasonable interpretation standard applies in IPR proceedings). Anticipation is a question of fact reviewed for substantial evidence. *In re Suitco Surface, Inc.*, 603 F.3d 1255, 1259 (Fed. Cir. 2010). Obviousness is a legal conclusion reviewed *de novo*, based on underlying facts reviewed for substantial evidence. *KSR Int'l Co. v. Teleflex Inc.*, 550 U.S. 398, 427 (2007). In a finding of obviousness, the underlying factual considerations reviewed for substantial evidence include: "(1) the scope and content of the prior art; (2) the differences between the prior art and the claimed invention; (3) the level of ordinary skill in the art; and (4) any relevant secondary considerations." *Power-One, Inc. v. Artesyn Techs., Inc.*, 599 F.3d 1343, 1351 (Fed. Cir. 2010) (citing *Graham v. John Deere Co.*, 383 U.S. 1, 17-18 (1966)).

II. THE CHALLENGED '791 PATENT CLAIMS

A. Substantial Evidence Supports The Board's Findings That Claims 1-4, 29-33, And 41 Are Anticipated By And/Or Obvious Over Woodhill

The challenged '791 patent claims focus on the broad concept of using a "substantially unique identifier" to identify and access data items and to perform

basic file-management functions. A2559-2562. Claim 1, from which claims 2-4 and 29 depend, recites the following apparatus:

> In a data processing system, an apparatus comprising:
>
> ***identity means*** for determining, for any of a plurality of data items present in the system, a substantially unique identifier, the identifier being determined using and depending on all of the data in the data item and only the data in the data item, whereby two identical data items in the system will have the same identifier; and
>
> ***existence means*** for determining whether a particular data item is present in the system, by examining the identifiers of the plurality of data items.

A2559. Claim 30, from which claims 31-33 and 41 depend, is similar and recites a method of identifying a data item that includes "determining a substantially unique identifier for the data item" and "accessing" the data item using the identifier. A2560.

The Board carefully weighed the evidence and the parties' competing arguments, and correctly found that Woodhill anticipates the challenged claims. For claim 1, for example, the Board found that Woodhill discloses "calculating Binary Object Identifiers 74" ("substantially unique identifiers") for each binary object ("data item") and then comparing them against their counterparts in File Database 25. A54. Woodhill also discloses that the Binary Object Identifiers are calculated "based on the content of each binary object instead of from an external or arbitrary source." A59. Woodhill's system thus discloses the "identity means"

recited in claim 1 of the '791 patent. Woodhill also discloses the claimed "existence means," because it "determines whether a binary object or file is present in the system" when it checks to see if the Binary Object Identifier for the binary object "exists among the plurality of Binary Object Identifiers 74 stored in File Database 25." A56.

The Board also determined, in the ***alternative***, that even if it were to assume that the claimed "identity means" requires the use of a specific hash function (MD5)—as PersonalWeb argued below and re-urges on appeal—claims 1-4 and 29 are still obvious. A88-89. The Board credited Dr. Clark's testimony that (1) Woodhill's Binary Object Identifier 74 and MD5 are the same byte length, and (2) MD5 "was old and well-known in the art at the time of the invention of the '791 patent." A89. Accordingly, as the Board found, substituting an MD5 hash for Woodhill's hash would have been a "predictable use of prior art elements according to their established functions—an obvious improvement." A89.

B. PersonalWeb's Arguments Lack Merit

1. The Board correctly construed "identity means" ('791 patent, claims 1-4 and 29)

The Board and the parties agreed on the required function for the "identity means":

> [D]etermining, for any of a plurality of data items present in the system, a substantially unique identifier, the identifier being determined using and depending on all of the data in the data item and

> only the data in the data item, whereby two identical data items in the system will have the same identifier.

A43. The Board construed the corresponding structure as "a data processor programmed to perform a hash function, e.g., MD5 or SHA." A43.

PersonalWeb does not dispute that Woodhill discloses the required structure as the Board construed it. Instead, PersonalWeb argues (Br.29-39) that the Board's construction was too broad. PersonalWeb contends that the Board should have adopted a construction incorporating ***some*** aspects of the preferred embodiments while completely ignoring others—a construction that even PersonalWeb's own expert could not support. *See Univ. of Pittsburgh of Commonwealth Sys. of Higher Educ. v. Varian Med. Sys., Inc*., 561 F. App'x 934, 941 (Fed. Cir. 2014) (nonprecedential) (a party may not "pick and choose which steps it deems necessary by synthesizing steps from disparate portions of the written description"); *see also* A5932-5933(¶32) (confirming Dr. Dewar had "no opinion" on whether PersonalWeb's proposed construction was correct). The Board correctly rejected PersonalWeb's proposed added limitations as unnecessary to perform the claimed function.[9]

[9] PersonalWeb's attempt to narrow the construction of "identity means" conflicts with its statements suggesting that the inventors of the patents-at-issue were the first to develop the general concept of content-based identification (Br.3-9) and the first to use data identifiers based on "all" the data and "only" the data in a data item (A3242-3243).

First, PersonalWeb's suggestion that the Board was required to include specific citations to the specification in its claim construction (Br.31) is meritless. Although it is appropriate to study and cite the specification in determining the corresponding structure—as the Board explicitly did here (A18-20; A43-46)—this Court has never required citations in the construction itself, nor has it suggested that a lack of citations could be grounds for reversal if the construction correctly reflects the disclosed structure. Instead, the construction need only identify the relevant structure.[10]

Second, the Board correctly rejected PersonalWeb's argument (Br.33-34) that the "identity means" must be a "cryptographic" MD5 or SHA hash, with the five characteristics identified at columns 12:54-13:19 (A2545-2546). A44-45. The word "cryptographic" does not appear ***anywhere*** in the specification's description of the preferred embodiments. And the five characteristics at 12:54-13:19 are not ***necessary*** to perform the claimed function. *See Micro Chem., Inc. v.*

[10] PersonalWeb's reliance on IPR Rule 42.104(3) (Br.31) is misplaced. That rule requires that an IPR ***petition*** identify the portions of the specification relevant to a means-plus-function term so that the Board may evaluate any claim construction issues; it does ***not*** impose any requirements on the Board's decision. Moreover, even if PersonalWeb's reading of Rule 42.104(3) were correct (and it is not), PersonalWeb's formalistic argument does not identify any error in reasoning, and thus would at most justify a wasteful remand for the Board simply to add a citation to its construction. *Cf. In re Reuning*, 276 F. App'x 983, 987 (Fed. Cir. 2008) (nonprecedential) ("When an agency … fails to explain its findings of fact and conclusions of law or fails to consider all relevant factors, 'the proper course, except in rare circumstances, is to remand to the agency for additional investigation or explanation.'" (citation omitted)).

Great Plains Chem. Co., 194 F.3d 1250, 1258 (Fed. Cir. 1999).[11] Any hash function can accept as an input to the algorithm "all of the data in the data item and only the data in the data item" (the ***first*** part of the claimed function), and the Board correctly found that Woodhill's binary hash does this. A59. Moreover, PersonalWeb's own expert admitted that any hash function also would ensure that "two identical data items in the system will have the same identifier" (the ***second*** part of the claimed function). A8784:16-22. *See, e.g.*, *John Mezzalingua Assocs. v. ITC*, 437 F. App'x 886, 889-890 (Fed. Cir. 2011) (nonprecedential) (rejecting incorporation of structure where embodiment without that structure would still perform the claimed function, and noting that means-plus-function limitation should "not import structures that, though present in the preferred embodiment, are not actually necessary"). In fact, the '791 specification expressly references the use of hash functions with "lower probabilities of uniqueness" for "some less-preferred embodiments of the present invention": specifically, hash functions that have "lower probabilities of uniqueness may be acceptable, depending on the types

[11] PersonalWeb argued below that the "identity means" requires an MD5 or SHA hash. *See, e.g.*, A2287 ("The specification states that … MD5 or SHA (cryptographic hashes) 'must' be employed on a system-wide basis ('791 patent, col. 13:15-19)."). The Board correctly found that MD5 or SHA are not required for the claimed function. A44-45. To the extent that PersonalWeb now no longer argues that MD5 or SHA are required, and instead asserts that the construction should encompass some broader set of hashes incorporating the five characteristics, that argument is waived. *See Solvay S.A. v. Honeywell Int'l Inc.*, 742 F.3d 998, 1003 (Fed. Cir. 2014) ("The doctrine of waiver 'has been applied to preclude a party from adopting a new claim construction position on appeal.'").

of applications and mechanisms used." A2546(13:46-49); *see Univ. of Pittsburgh*, 561 F. App'x at 941 (rejecting argument that corresponding structure should incorporate "specific embodiments" of disclosed algorithm, where specification "describes certain implementations of the algorithm [but] expressly notes that other implementations are possible").

Third, the Board also correctly rejected PersonalWeb's argument (Br.35-37) that the "identity means" must calculate a "hash of hashes" for compound (*i.e.*, longer) data items. The specification is explicit that the identifier can be a simple hash rather than a "hash of hashes." A2546(14:36-39) ("[T]he use of segments [to create a "hash of hashes"] ... [is] ***not strictly required*** in a system using the present invention …."). In fact, PersonalWeb itself acknowledges that a "hash of hashes" is not a "necessary" element of the claims. Br.37 ("The mechanism for calculating a True Name for compound data items ***may not be absolutely necessary*** to the invention.").

Moreover, claim 19, which depends from claim 1, differs only in its recitation of a compound hash of hashes. Claim 18 describes the "apparatus as in claim 1, wherein at least some of said data items are compound data items." A2560. Claim 19 depends from claim 18 and describes the "hash of hashes" technique. Claim differentiation thus strongly indicates that a compound "hash of hashes" is not "necessary" to the "identity means" of claim 1, otherwise claim 19

would be completely subsumed by claim 1. *See Univ. of Pittsburgh*, 561 F. App'x at 942 (claim differentiation provides "'guidance and context for interpreting a disputed means-plus-function limitation'" (citation omitted)).

Finally, even if PersonalWeb's proposed construction for the "identity means" were correct, any error would be harmless. The Board specifically found that it would have been obvious to combine Woodhill with an MD5 hash (A88-89), which PersonalWeb acknowledges would satisfy the "identity means" limitation even under PersonalWeb's construction (Br.34). Indeed, the patent specification mandates that conclusion. *See* A2546(13:10-14) ("[A] family of functions with the above [five] properties are the so-called message digest functions … includ[ing] MD5 ….").[12]

[12] PersonalWeb argues in a footnote (Br.38 n.7) that "it is of no moment" that the Board found that modifying Woodhill to use MD5 would be obvious, because the Board did not find that modifying Woodhill to include a compound "hash of hashes" would be obvious. This argument has not been preserved. *See Otsuka Pharm. Co. v. Sandoz, Inc.*, 678 F.3d 1280, 1294 (Fed. Cir. 2012) ("Arguments raised only in footnotes … are waived."). In any event, as PersonalWeb acknowledges, a compound hash of hashes is not necessary to the claimed invention. *See supra* p. 37. Moreover, even if PersonalWeb were correct (which it is not) that the Board's construction should have incorporated the "hash of hashes" technique as an "alternative embodiment" (Br.36-37), that would be irrelevant in light of the Board's finding that Woodhill discloses at least one embodiment claimed in the '791 patent. Anticipation does not require that the prior art reference disclose every separate embodiment in a patent. *See Brown v. 3M*, 265 F.3d 1349, 1351 (Fed. Cir. 2001).

2. The Board did not re-construe the function for "existence means" ('791 patent, claims 1-4, 29)

Claim 1 also recites "existence means for determining whether a particular data item is present in the system, by examining the identifiers of the plurality of data items." A2559. Consistent with both parties' proposals, the Board construed the corresponding function in its institution decision as "determining whether a particular data item is present in the system, by examining the identifiers of the plurality of data items." A20.

PersonalWeb argues that the Board "rewrote the function" for the "existence means" in its final decision. Br.40. That argument is meritless. Far from changing its construction, the Board ***restated*** its articulation of the claimed function in its final decision. A55 (referring to the "claimed function of 'determining whether a particular data item is present in the system'"). PersonalWeb thus challenges not a claim construction determination, but an ***anticipation*** finding: the Board simply rejected PersonalWeb's argument that Woodhill did not have the corresponding structure for the "existence means" because Woodhill's corresponding structure did not search ***every file*** in the system. A53-54. Accordingly, this issue is appropriately reviewed for substantial evidence.

The Board's conclusion was correct under any standard. PersonalWeb does not dispute that the Board correctly identified the corresponding structure for the "existence means" as a "data processor programmed according to ***step S232***

illustrated in Figure 11 or step S260 illustrated in Figure 14." Br.40. The '791 patent describes "step S232" as "look[ing] for an entry for the True Name in the True File registry 126." A2546-2547(14:53-56, 15:54-56). The Board correctly concluded that Woodhill meets this limitation by "calculating Binary Object Identifiers 74 for each binary object and then comparing them against their counterparts in File Database 25"; it did not additionally need to search all files in the system. A54.

Indeed, PersonalWeb's own expert ***agreed*** that the '791 patent "certainly does not demand" searching all files in a database, A7453, and that such an approach would not make sense, A4750-4753; A4776; A4902-4903. Dr. Dewar further acknowledged that even the preferred embodiments of the '791 patent do not search all files in the database:

> Q. When you were making that answer, are you assuming as part of that answer that when the claim says present 'in the system' that you have to look at all the other file information or not?
>
> A. ***You never look at, even in the ideal embodiment of '791, you don't look at all files***, you just look at a subsection of files which are in the true file registry. ***So no one claims that you are looking at all the files. <u>That would be an incorrect construction</u>***.

A4902-4903; *see Accent Packaging, Inc. v. Leggett & Platt, Inc.*, 707 F.3d 1318, 1326 (Fed. Cir. 2013) ("[A] claim interpretation that excludes a preferred embodiment from the scope of the claim is rarely, if ever, correct.").

PersonalWeb similarly asserted in related district court litigation between the parties that the "existence means" does ***not*** require searching all files in the system, but instead requires only "routines that examine the identifiers of two or more data items to determine whether a particular data item is present in the system ***or at a location*** in the system." A5460.

PersonalWeb contends here, contrary to Dr. Dewar's testimony and to its own district court position, that "determining whether a data item is present in the system" is different from "determining whether a file exists in a registry or table." Br.42. But Woodhill and the '791 embodiments both determine the ***former*** by determining the ***latter***. Just as a student might "determine" whether a definition for "dog" is present in a dictionary by turning directly to the "D" entries, rather than looking at every entry from A to Z, Woodhill determines whether a data item is present in the system by checking the relevant part of its File Database 25. A2839(3:49-52; 4:1-32); A2842(9:9-14). As PersonalWeb's own expert conceded (A4902-4903), that is all the claim requires.[13]

The Board thus correctly found that Woodhill discloses the claimed "existence means." A57. In fact, it operates in the same way as the '791 patent's

[13] Thus, to the extent the Court concludes that there is a "claim construction" issue here (though there is not), the Court should affirm that claim 1's "existence means" does not need to search all files in the system, but rather need only do what the'791 patent's disclosed embodiments do: compare a data item's identifier to the entries in a registry or table. That suffices to "determin[e] whether [the] data item is present in the system."

embodiments: it determines whether a binary object is present in the system by checking to see whether its identifier (Binary Object Identifier 74) exists in a database (File Database 25). A54. The Board credited Dr. Clark's testimony in concluding that this process satisfies the function corresponding to "existence means." A56.[14] These findings are supported by more than substantial evidence, are correct under any standard, and should be upheld.

3. Substantial evidence supports the Board's finding that Woodhill discloses "accessing" a "data item" "using the identifier of the data item" ('791 patent, claims 4, 29-32, and 41)

Claims 4, 29-32, and 41 of the '791 patent require "accessing a [particular] data item … using the identifier of the data item." A2559-2560. Substantial evidence supports the Board's finding that at least Woodhill's auditing procedure, which is part of its Distributed Storage Manager, satisfies this requirement because the procedure uses a Binary Object Identifier 74 to access a randomly selected binary object. A69; A75.

[14] PersonalWeb asserts that Dr. Clark agreed that "Woodhill has no capability to determine 'whether' a particular data item is present 'in the system.'" Br.44. But Dr. Clark gave no such opinion in the testimony cited by PersonalWeb; he merely agreed that Woodhill does not search ***all files*** in the database. *See, e.g.*, A5127-5133(¶6). PersonalWeb's own expert admitted that such an approach is well-known and familiar. A4750-4751. He also admitted that, by comparing binary object identifiers, Woodhill can determine whether a binary object exists in the system (A4803-4804) and that the '791 preferred embodiment itself does not search all files in the database either (A4902-4903). On this record, the Board was fully entitled to credit Dr. Clark's testimony.

PersonalWeb again attempts to turn a factual issue of anticipation (reviewed for substantial evidence) into a legal question, this time by asserting that the Board "credit[ed] hypothetical embodiments to find anticipation." Br.65. Of course, whether a prior art reference anticipates is a "question of fact reviewed for substantial evidence." *Suitco*, 603 F.3d at 1259 (citation omitted). Moreover, the Board did not rely on "hypothetical embodiments." Instead, it correctly rejected PersonalWeb's counterintuitive argument that Woodhill's auditing procedure uses File Location 38 and File Name 40—rather than Binary Object Identifiers—to access binary objects (A66-69). This finding was amply supported by more than substantial evidence.

As the Board recognized, Woodhill's description of the auditing procedure explicitly discloses "initiat[ing] a restore of a randomly selected binary object identified by ***Binary Object Identification Record 58*** stored in File Database 25," A67, and Binary Object Identifier 74 is "the only part of [Binary Object Identification record 58] that uniquely identifies the binary object associated therewith." A68; *see also* A2839(4:35-47); A2841(8:33-36; 7:64-8:1); A2846(18:16-19). The Board thus properly concluded that the auditing procedure uses Binary Object Identifier 74 to access binary objects, crediting Dr. Clark's testimony that "it was old and well-known to access objects using their identifiers." A68.

PersonalWeb makes much of Dr. Clark's testimony that he does not know the particular details of ***how*** Woodhill uses Binary Object Identifier 74 to access a binary object. Br.66-67. But as Dr. Clark explained, there was no need for Woodhill to include such details, because a skilled artisan would understand to "take a Binary Object Identifier and use[] that to look up the binary object." A5861-5862; A5141-5142(¶20). That is all the claim requires. PersonalWeb's own expert agreed that such a basic operation does not require detailed explanation. A8790. This evidence is more than sufficient to support the Board's findings; a prior art reference need not spell out material that a skilled artisan would readily understand from the reference. *See, e.g.*, *In re Baxter Travenol Labs.*, 952 F.2d 388, 390 (Fed. Cir. 1991) (finding anticipation although there was "no express reference to DEHP" in Becker reference because a skilled artisan would have understood the disclosure as including DEHP; "the dispositive question regarding anticipation [is] whether one skilled in the art would reasonably understand or infer from the Becker document's teaching that Becker's primary bag was plasticized with DEHP"); *In re Preda*, 401 F.2d 825, 826 (C.C.P.A. 1968) ("[I]n considering the disclosure of a reference, it is proper to take into account not only specific teachings of the reference but also the inferences which one skilled in the art would reasonably be expected to draw therefrom.").

Accordingly, the Board's finding that Woodhill discloses using Binary Object Identifiers to access binary objects during its audit process was not "speculation" (Br.66), but rather was amply supported by substantial evidence, namely Woodhill's explicit disclosures, along with expert testimony explaining what a skilled artisan would understand is disclosed in Woodhill. A68; *Gartside*, 203 F.3d at 1320.[15] Thus, the cases PersonalWeb cites are inapposite: this is not a situation where Woodhill's disclosures "***could*** have been arranged" to satisfy the "accessing" limitations (*Therasense*, 593 F.3d at 1333), or where the Board "read into references things that are not there" (*In re Arkley*, 455 F.2d 586, 589 (C.C.P.A. 1972)). Rather, the Board's finding, supported by substantial evidence, is that Woodhill ***does disclose*** the claim limitations. A69 ("Woodhill … describes the function 'accessing a particular data item using the identifier of the data item ….'").[16]

[15] Contrary to PersonalWeb's assertion (Br.66, 67), the Board's use of the word "may" does not reflect uncertainty as to Woodhill's disclosure, but rather a finding that Woodhill discloses that a binary object or file ***is capable of*** being accessed ("may be accessed") using its Binary Object Identifier, among other ways. A69.

[16] PersonalWeb's argument that the Board "failed to follow controlling law regarding inherent disclosure" (Br.68) is a red herring. The Board did not make a finding of inherency, but rather concluded that Woodhill *directly* discloses the "accessing" limitations to a skilled artisan. A66-69.

4. Substantial evidence supports the Board's finding that Woodhill discloses "determining" whether a data item is "not present" at a "location" ('791 patent, claims 33 and 41)

Claims 33 and 41 of the '791 patent require "determining" whether a data item is present at a "destination location" or "current location," and if it is "not present," "providing" the data item (claim 33) or "fetching" the data item (claim 41) from another location. A2561-2562. PersonalWeb again attempts to turn a factual dispute over Woodhill's disclosure into a legal one, asserting that the Board "credit[ed] hypothetical elements in Woodhill." Br.71. To the contrary, the Board simply made a factual determination that Woodhill satisfies the limitations. A76-85. The Board was well within its authority to disregard PersonalWeb's attempt to distort Dr. Clark's positions with testimony based on "constrained" hypothetical questions—the same testimony PersonalWeb now urges this Court to reweigh on appeal. A82-83. PersonalWeb has not undermined the substantial evidence supporting the Board's finding.

As the Board found, Woodhill's backup procedure satisfies claims 33 and 41 because it discloses "determining whether a binary object or file corresponding to Binary Object Identifier 74 is present at remote backup file server 12 and, if not, transmitting it to that location." A84-85. The Board found that Woodhill also separately satisfies claim 41 because it discloses, among other things, "fetching a

binary object from a remote location if it is no longer present, e.g., lost or destroyed, at a current location." A80.

PersonalWeb argues that, because Woodhill determines whether a binary object is "present" by comparing the Binary Object Identifier calculated in the current backup cycle with the identifier stored during the prior backup cycle, *see* A2842(9:9-22), Woodhill "never confirms whether the Binary Object is 'not present' elsewhere on the remote backup server." Br.70. PersonalWeb's argument is simply a replay of its argument regarding "existence means," which is refuted at pages 39-42 above. As PersonalWeb's own expert acknowledged, "***[y]ou never look at, even in the ideal embodiment of '791, you don't look at all files.***" A8947.[17] Dr. Clark similarly explained that a search of every file on the remote backup server is not necessary to satisfy the "not present" limitation, because a comparison to the identifier stored during the prior backup cycle is generally sufficient to determine whether the object is present on the server at all. A5127-5132. As Dr. Clark explained, unique files (*e.g.*, an individual's resume) are generally the largest class of files in a computer system, and one would find identical content only in the previously backed-up version of the same document,

[17] PersonalWeb's suggestion that the Board limited its analysis to "remote backup server 12" (Br.69) is also incorrect. For claim 41, for example, the Board found that Woodhill satisfies the claim both (1) when the remote server is the "current location" and fetches a binary object from the local computer, and also (2) when the local computer is the "current location" and fetches a binary object from the remote server. A80-81.

not elsewhere on the remote file server. A5127-5128(¶¶6-8).[18] Moreover, even for duplicate files, Woodhill's backup process would identify whether each separate file is "not present" on the remote file server on a subsequent backup. A5128-5132. Accordingly, contrary to PersonalWeb's assertion (Br.70-71), Dr. Clark's testimony fully supported the Board's finding that, by determining whether a binary object is present or not present "at a particular location in the system," Woodhill determines whether it is present or not present on the remote backup server as a whole. A5133-5135(¶¶11-12). The Board's rejection of PersonalWeb's reading of Woodhill is thus amply supported by substantial evidence.[19]

[18] The fact that Woodhill satisfies the claim limitation with respect to unique files is in itself adequate for purposes of anticipation. *See Hewlett-Packard Co. v. Mustek Sys., Inc.*, 340 F.3d 1314, 1326 (Fed. Cir. 2003) ("Just as 'an accused product that sometimes, but not always, embodies a claimed method nonetheless infringes,' a prior art product that sometimes, but not always, embodies a claimed method nonetheless teaches that aspect of the invention.").

[19] PersonalWeb asserts in a footnote that Dr. Clark "adjusts the location of quotation marks" to suggest that "Woodhill compares a single, newly-calculated Binary Object Identifier against multiple Binary Object Identifiers." Br.70 n.18. The objection is incomprehensible; Dr. Clark's discussion of the "not present" limitation occurs earlier in his declaration, where he quotes the relevant passage in full, without any challenge from PersonalWeb. A5126-5127 (quoting A2842(9:10-25)). That he later includes a shorter quotation of the same material when discussing a separate limitation ("existence means") (A5136-5137) does not in any way undermine his analysis.

5. Substantial evidence supports the Board's finding that Woodhill discloses "accessing a data item" and "determining … and … fetching" ('791 patent, claim 41)

Claim 41 of the '791 patent depends from claim 30, which recites "accessing a data item in the system using the identifier of the data item." A2560. As referenced above, claim 41 further requires that this "accessing" include "determining whether the data item corresponding to the given data identifier is present at the current location" and, if it is not present, "fetching the data item from a remote location in the system to the current location." A2562.

PersonalWeb argues that the Board improperly combined disclosures from Woodhill's audit and backup procedures to satisfy claim 41. But PersonalWeb never challenges the Board's finding that these procedures are part of the ***same embodiment*** in Woodhill—they are "distinct functions that operate with other functions to form one unitary computer program." A78. That finding is certainly supported by substantial evidence, given Woodhill's clear statement on this point:

> For explanation purposes, the Distributed Storage Manager program 24 is divided into several distinct functions which will be discussed in turn. Those of ordinary skill in the art will recognize, however, that ***each of the distinct functions operates in cooperation with the other functions to form a unitary computer program***.

A2839-2840(4:64-5:2).

PersonalWeb's suggestion that claim 41 cannot be met by two software procedures performed by a single "unitary program" is inconsistent with the '791

patent itself, which discloses embodiments in which the "accessing" and "fetching" functions are performed by different software mechanisms. In those embodiments, the step of "accessing" a data item is performed by the "Make True File Local" mechanism:

> Make True File Local
>
> ….
>
> First, look in the True File registry 126 for a True File entry record 140 for the corresponding True Name (Step S292). If no such entry is found this mechanism fails. If there is already a True File ID for the entry (Step S294), this mechanism's task is complete.

A2548(17:10-23); A26. However, the step of "fetching the data item from a remote location" is performed by a distinct mechanism, called the "Locate Remote File primitive mechanism":

> If no known source can realize the True File, use ***the Locate Remote File primitive mechanism*** to attempt to find the True File (Step S308). If this succeeds, realize the True File from the identified source location and continue with step S296.

A2548(17:41-45).

Net MoneyIN is thus clearly distinguishable. In that case, a prior art reference disclosed two protocols for credit card payments which were not intended to be used together; indeed, this Court considered them "***mutually exclusive*** payment models." 545 F.3d at 1363 n.1. Notably, the parties in *Net MoneyIN* "d[id] not contend that the iKP reference disclose[d] all of the limitations

recited in claim 1 arranged or combined in the same way as in the claim." *Id.* at 1371. Here, by contrast, the disclosures at issue are not "mutually exclusive" embodiments, but rather two steps intended to be used together in "one unitary computer program," as EMC contended and the Board properly found based on substantial evidence. A78.[20]

PersonalWeb's reliance on *Wm. Wrigley Jr. Co. v. Cadbury Adams USA LLC*, 683 F.3d 1356 (Fed. Cir. 2012) (Br.54), is perplexing, because there the Court ***distinguished*** *Net MoneyIN* and affirmed a finding of anticipation, *id.* at 1361. The Court rejected the patentee's argument that a prior art reference did not disclose all the claim limitations (relating to chewing gum) "in the combination recited" because, although the reference disclosed many possible components, it referred to the claimed components "in a single product." *Id.* at 1360-1361. Just so here: Woodhill discloses all of the claim limitations in "a single product"—the unitary Distributed Storage Manager program.

Finally, PersonalWeb suggests that Woodhill's auditing and backup procedures cannot satisfy claim 41 because the auditing procedure only runs after

[20] Before the Board, PersonalWeb argued that Woodhill's backup and auditing steps were "unrelated embodiments." A2311. On appeal, PersonalWeb now replaces "embodiments" in its argument with "protocols," the term used in *Net MoneyIN*. But regardless of semantics, the facts here have no resemblance to the facts of *Net MoneyIN*, because the audit and backup procedures are components of the same embodiment, *i.e.*, Woodhill's unitary software program, and are not "mutually exclusive," as was the case in *Net MoneyIN*.

the backup procedure is finished. Br.57-58. That argument is meritless. The Board properly recognized that the ***initial*** backup of a binary object, which results in the copying of the binary object to two locations, allows the Distributed Storage Manager program to perform the ***later*** part of the backup that "fetch[es] a binary object from a remote location if it is no longer present, e.g., lost or destroyed, at a current location." A80. The Board focused on this restore feature in its analysis of claim 41. A80; *see also* A2842(10:32-34) ("If the local backup copy of a file does not exist or a prior version of a file is required, it must be restored from the remote backup file server 12."). Woodhill specifically refers to this restore feature when discussing the audit procedure, indicating that the audit procedure can be used to ensure that "binary objects that have been backed up can be restored." A2846(18:11-14). In particular, if the audit procedure cannot access the binary object on the local computer, the Distributed Storage Manager program restores the selected binary object from the remote backup file server. A2846(18:10-23). Together, the audit and restore features plainly satisfy claim 41, even under PersonalWeb's new theory. As discussed at pages 42-45 above, the audit procedure attempts to access a binary object (a "data item") using its Binary Object Identifier ("identifier"). If this procedure determines that the binary object is not present on a local computer (the "current location"), the restore feature will then fetch the data item from the remote server (the "remote location"). A2562. The

Board's findings are accordingly supported by substantial evidence and should be upheld. [21]

6. PersonalWeb shows no error in the Board's obviousness analysis

The Board held that claims 1-4 and 29 of the '791 patent were also invalid as obvious. A101. Apart from a repetition of its arguments regarding anticipation (Br.73-76), PersonalWeb's only challenge to obviousness is its assertion that the Board did not adequately discuss each *Graham* factor (Br.76-79). PersonalWeb's argument fails.

The Board enumerated the four *Graham* factors in its discussion of obviousness and properly applied each factor. *See, e.g.*, A86 (listing the four *Graham* factors); A86-91. For the first and second factors, the Board carefully considered the scope and content of Woodhill's disclosures, including incorporating the discussion of Woodhill in its anticipation analysis (A87), and compared those disclosures to the claimed subject matter. A88-89. Similarly, for the third factor, the Board considered and rejected PersonalWeb's assertion of secondary considerations, based on a lack of nexus to the claims. A90-91. It also

[21] PersonalWeb asserts in a footnote (Br.58 n.14) that its argument regarding claim 41 applies to claims 30-32. Besides being insufficiently preserved in its appellate brief, *see Otsuka Pharm. Co.*, 678 F.3d at 1294, PersonalWeb never made this argument with respect to claims 30-32 before the Board, so the point is doubly waived. It is also meritless: Woodhill discloses the steps of claims 30-32 through the audit procedure and the creation of binary object identifiers, which are likewise performed by a single unitary program. A66-69; A75; A76.

concluded that, even if there were some evidence of secondary considerations, it was "outweighed by the strong evidence of obviousness over Woodhill." A91.

PersonalWeb's assertion that there was "no discussion at all" of the fourth factor, the level of ordinary skill in the art (Br.78; Br.66 n.16), is curious given that the Board's decision includes a section entitled "The Level of Ordinary Skill in the Art," where the Board discusses the relevant law, states that "[t]here is sufficient evidence in the record before us that reflects the knowledge level of a person of ordinary skill in the art," and then recites that "evidence": the "attest[ation]" of ***PersonalWeb's expert***, Dr. Dewar, that "a person with ordinary skill in the art would be an individual with a bachelor's degree in computer science who possesses ten to fifteen years of teaching or work experience in the field of data processing systems." A46. It is clear from this context that the Board adopted Dr. Dewar's testimony on this point. The Board also made multiple findings regarding what Woodhill would have taught to one of ordinary skill in the art. *See, e.g.*, A89 ("[*O*]*ne with ordinary skill in the art* would have substituted an MD5 hash algorithm … for Woodhill's binary hash algorithm.").

Moreover, PersonalWeb's objection identifies no reason why any further explication of the Board's finding regarding of the level of skill would have changed the Board's obviousness determinations. *See Litton Indus. Prods., Inc. v. Solid State Sys. Corp.*, 755 F.2d 158, 163-164 (Fed. Cir. 1985) (holding that a

"specific finding on the level of skill in the art is not … required where the prior art itself reflects an appropriate level and a need for [such] testimony is not shown").

Finally, even if PersonalWeb's characterization of the decision were correct, this Court has explicitly rejected PersonalWeb's formalistic approach, looking instead to whether the *Graham* factors are reflected in the judgment below, whether or not explicitly discussed. *See MySpace, Inc. v. GraphOn Corp.*, 672 F.3d 1250, 1263-1264 (Fed. Cir. 2012) ("We do not require that district courts enumerate each of the *Graham* factors when making an obviousness determination. … [W]e do not wish to overburden our trial courts when the record establishes that the evidence was properly before and considered by the court."); *Specialty Composites v. Cabot Corp.*, 845 F.2d 981, 990 (Fed. Cir. 1988) (the absence of an express *Graham* analysis "is no[t] reversible error if the required factual determinations were actually made and it is clear that they were considered while applying the proper legal standard of obviousness"). Because PersonalWeb has shown no error in the Board's analysis, its challenge to the obviousness findings should be rejected.[22]

[22] *Loctite Corp. v. Ultraseal Ltd.*, 781 F.2d 861 (Fed. Cir. 1985), *overruled on other grounds*, *Nobelpharma AB v. Implant Innovations, Inc.*, 141 F.3d 1059 (Fed. Cir. 1998), is inapposite. In *Loctite*, the lower court had made "no specific factual findings on the scope and content of the prior art and the claims at issue, level of ordinary skill in the pertinent art, or other indicia useful in determining the obviousness/nonobviousness question." *Id.* at 873 (citation omitted). Here, the

III. THE CHALLENGED '280 PATENT CLAIMS

A. Substantial Evidence Supports The Board's Findings That Claims 36 And 38 Are Anticipated By And/Or Obvious In View Of Woodhill

Claims 36 and 38 of the '280 patent claim the broad concept of using content-based identifiers to store, request, and provide copies of data files from a set of servers. Claim 36, for example, recites:

> A method of delivering a data file in a network comprising a plurality of processors, some of the processors being servers and some of the processors being clients, the method comprising:
>
> storing the data file is [sic] on a first server in the network and storing copies of the data file on a set of servers in the network distinct from the first server; and
>
> responsive to a client request for the data file, the request including a hash of the contents of the data file, causing the data file to be provided to the client.

A6989.

The Board found claims 36 and 38 anticipated by Woodhill. For claim 36, for example, the Board found that Woodhill's binary objects are "data files" (A132, A135-136) and are stored on multiple servers (A142). It also found that Woodhill's auditing procedure causes a copy of a binary object to be provided to a client in response to a "client request for the data file, the request including a hash of the contents of the data file" because it involves "using Binary Object Hash field

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Board made numerous factual findings on those factors, all supported by substantial evidence. A85-91.

70 in Binary Object Identifier 74 to identify and request a randomly selected binary object by retrieving its corresponding Binary Object Identification record 58 in File Database 25." A129; A133-134. The Board credited Dr. Clark's testimony in reaching these conclusions, finding it consistent both with the general understanding of a skilled artisan and with Woodhill's disclosure. *See, e.g.*, A128; A132.

The Board also found, in the alternative, that even if PersonalWeb were correct that Woodhill did not disclose "storing copies of the data file on a set of servers in the network distinct from the first server" (though Woodhill does disclose that), it would have been obvious to modify Woodhill to include that feature, because it "amounts to nothing more than the combination of familiar elements according to a known method that predictably would result in ensuring that at least one copy of each binary object or file is preserved and not destroyed." A142-143.

B. PersonalWeb's Arguments Lack Merit

1. Substantial evidence supports the Board's finding that Woodhill discloses "providing the data file to the client" ('280 patent, claims 36 and 38)

PersonalWeb's sole challenge to the Board's finding of anticipation of the '280 patent claims is sparse to say the least: it consists of a single sentence suggesting that the limitations "causing the data file to be provided to the client"

(claim 36) and "providing the data file to the client" (claim 38) are subject to the same arguments as PersonalWeb raises regarding the "accessing a data item" limitations in the '791 patent. Br.65. PersonalWeb does not explain why the limitations should be treated in the same way, and does not develop any appellate argument sufficient to permit a response. *See SmithKline Beecham Corp. v. Apotex Corp.*, 439 F.3d 1312, 1320 (Fed. Cir. 2006) ("[I]ssues adverted to in a perfunctory manner, unaccompanied by some effort at developed argumentation, are deemed waived.").

In any event, PersonalWeb's meritless "hypothesizing" arguments are addressed at pages 42-45 above. The only substantive discussion of the '280 patent anywhere in PersonalWeb's argument is a footnote asserting that the Board ruled that PersonalWeb "failed to prove a negative"—that Woodhill does not use Binary Object Identifier 74 "to identify and request a particular binary object." Br.68 n.17 (quoting A127). Footnotes do not preserve arguments, *Otsuka Pharm. Co. v. Sandoz, Inc.*, 678 F.3d 1280, 1294 (Fed. Cir. 2012), and that footnote is in any event incorrect. Far from requiring proof of a negative, the Board affirmatively ***found*** that Woodhill ***does*** "use[] Binary Object Identifier 74 [including Binary Object Hash field 70] to identify and request a randomly selected binary object by retrieving its corresponding Binary Object Identification Record 58 in File Database 25." A128.

2. PersonalWeb shows no error in the Board's obviousness analysis

PersonalWeb's only challenge to the Board's obviousness finding regarding the challenged '280 patent claims is equally sparse. It claims, once again, that the Board failed to sufficiently discuss each of the *Graham* factors. As in its '791 decision, the Board's '280 decision appropriately considered and addressed all four *Graham* factors: it recognized the level of ordinary skill in the art (A119), held that the record reflected that level of skill (A119), and repeatedly referred to that level of skill in its decision (*e.g.*, A143); *see also supra* pp. 53-55. The Board also considered the scope and content of the prior art and the differences between the prior art and the claimed subject matter (A141-143), as well as PersonalWeb's arguments concerning secondary considerations (A143-144). The Board's obviousness analysis clearly satisfies this Court's approach to the *Graham* factors. *MySpace*, 672 F.3d at 1263-1264.

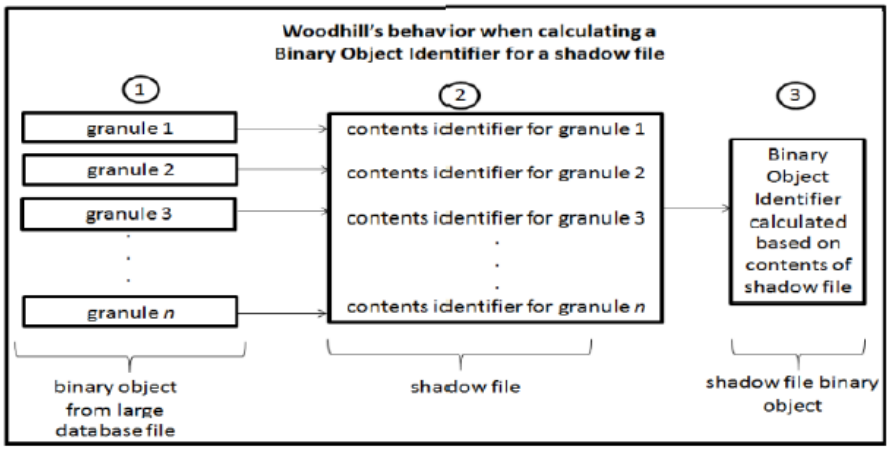
IV. THE CHALLENGED '544 PATENT CLAIM

A. Substantial Evidence Supports The Board's Findings That Claim 1 Is Anticipated By And/Or Obvious In View Of Woodhill And Kantor

Although '544 patent claim 1 is long, it is actually quite simple. The claim requires little more than obtaining "values" for two data items (where each value is a "hash of hashes"), and comparing those values to ascertain whether the two data items are the same (whether they "correspond" to each other). The data items are

each comprised of a "plurality of parts," and the "values" for the data items are obtained by applying a "first hash function" to the parts of each data item, and then applying a "second hash function" to the "part values" (*i.e.*, the hashes of the parts). A11157-11158.

The Board found that Woodhill and Kantor each individually anticipate claim 1. The Board found that Woodhill obtains a hash of hashes for a first data item when it creates a binary object identifier for a "shadow file" while backing up the shadow file. A197-204. Woodhill creates these "shadow files" in connection with its "granularization technique," a technique that involves dividing larger files into smaller segments or "granules," calculating a contents identifier for each granule, and storing the collection of contents identifiers in a "shadow file." A197-198. Woodhill then backs up each shadow file in the process of backing up all files on the system. A199-204; A2840(5:61-63). Since the shadow file is a list of contents identifiers (*i.e.*, a list of hashes), the binary object identifier for the shadow file is a "hash of hashes." A204. This process is depicted in a figure by Dr. Clark that the Board reproduced in its Final Decision:



A206; A13843(¶17). As part of the back-up process, Woodhill compares the binary object identifier for the shadow file with the binary object identifier for the previous version of the shadow file, and thus ascertains whether the two data items "correspond" to each other. A205-207. In reaching the conclusion that Woodhill thus satisfies the claim, the Board repeatedly "credit[ed] the testimony of Dr. Clark over that of Dr. Dewar," finding that Dr. Clark's opinions were consistent with Woodhill, while Dr. Dewar's were not. A202; A206-207.

The Board also found that Kantor creates contents signatures for each inner file of the zipfile by applying a hash function to each inner file, then applies a second hash function to the set of hashes as part of obtaining a "zip-file contents signature" (*i.e.*, a "hash of hashes"). A216-222.[23] The Board further found that Kantor ascertains whether two zipfiles "correspond" to each other when it

[23] As the Board referenced earlier in the decision (A208-209), Kantor—like the embodiments of the '544 patent (A11145(13:36-42))—also includes in its zipfile contents signatures additional bits representing the length of the files. A7033(Kantor).

compares these "zip-file contents signatures" (A209), a point that PersonalWeb does not dispute.

The Board also found, as a further alternative, that even if PersonalWeb were correct that Kantor and Woodhill did not separately anticipate claim 1 (arguments the Board rejected), "claim 1 would have been obvious over the combination of Kantor and Woodhill." A225. In particular, the Board found that "incorporating Woodhill's technique of dividing a file into a plurality of parts into Kantor's method of identifying duplicate files would not have been beyond the level of an ordinarily skilled artisan." A223 (citations omitted).

B. PersonalWeb's Arguments Lack Merit

1. Substantial evidence supports the Board's finding that Woodhill discloses "applying a second function to the part values" (*i.e.*, "hash of hashes") ('544 patent, claim 1)

PersonalWeb admits that Woodhill's granularization technique creates a "shadow file" with "contents identifiers" (*i.e.*, hashes) for each "granule" in a binary object, and "thus describes a first hash function." Br.59-60. It argues, however, that Woodhill fails to disclose applying a ***second*** hash function to the contents of the shadow file to obtain a "hash of hashes." *Id.* Although its disagreement about the scope of Woodhill's disclosure is unquestionably factual in nature, PersonalWeb again attempts to transform this issue into a legal one,

arguing that the Board ran afoul of *Net MoneyIN* in determining that Woodhill's backup and granularization protocols together satisfy the claim. Br.60-62.

Net MoneyIN is again distinguishable. Unlike in that case, the Board here made a factual determination that Woodhill's "unitary computer program" (A2839-2840) applies a "hash of hashes" ***precisely as described*** in claim 1. The Board's detailed findings on this issue are supported by ample evidence, including Woodhill's statement that "the default operation is to back up ***all files*** on all disk drives 19 on the local computer 20" (A2840(5:61-63)), which supports the finding that "each *shadow file*, like all files stored on disk drives 19, is divided into one or more binary objects to be backed up." A200-201. It also relied on Dr. Clark's detailed explanation of how Woodhill creates a "hash of hashes" in the process of backing up shadow files. A201-202. The Board explicitly "credit[ed] the testimony of Dr. Clark over that of Dr. Dewar," finding that Dr. Clark's explanations were "consistent with Woodhill," while Dr. Dewar's testimony "contradict[ed]" Woodhill's explicit disclosures. A202. The Board concluded that

> in the process of backing up shadow files, Woodhill would obtain a first value by calculating a binary object identifier (i.e., applying a second hash function) for each shadow file binary object (i.e., the part values – the first hash).

A201. The Board's determination that Woodhill "describes applying a second hash function to shadow files (i.e., 'a hash of hashes')" (A204) is thus supported by substantial evidence.

PersonalWeb also relies on Woodhill's statement that the "technique of subdividing files into 'granules' is only used to reduce the amount of data that must be transmitted to the remote backup file server 12 and *is not utilized in making backup copies of binary objects for storage on local computers 20*." A2845(15:4-9). The Board correctly found that PersonalWeb's reliance on that statement was "misplaced." A203. As Dr. Clark explained—and the Board agreed—this sentence simply identifies the particular server on which the backups of granules are stored (the ***remote*** backup file server, not another local computer). A13836-13837(¶8). It in no way undermines the Board's finding that the shadow files are, indeed, backed up through Woodhill's backup procedure, leading to a hash of the shadow file and thus a "hash of hashes." A203; A13836-13837(¶8); A10756.

2. Substantial evidence supports the Board's finding that Kantor discloses "applying a first function to each part of said first plurality of parts" ('544 patent, claim 1)

PersonalWeb separately challenges the Board's finding that Kantor discloses claim 1's "first hash function" (the hashes of the parts of the data item, as opposed to the hash of hashes of the "second hash function"). PersonalWeb asserts that "Kantor does not separate a zip file into a plurality of parts and then apply a hash function to each part." Br.72. The Board's rejection of this factual argument is fully supported by the record.

PersonalWeb once again attempts to recycle its "hypothetical embodiment" argument to manufacture a legal issue (Br.73 n.19), but the effort is no more successful here. PersonalWeb never even specifies what "hypothesizing" the Board supposedly did with respect to the '544 patent. Instead, PersonalWeb simply disputes the Board's ***factual*** finding that Kantor discloses "applying a first function to each part of said first plurality of parts."

PersonalWeb's argument is inconsistent with the claim itself. PersonalWeb contends that claim 1 requires "separating a 'data item' into a 'plurality of parts'" and "applying a hash function to each part" (Br.72), but the claim contains no such requirement. Indeed, the term "separat[e]" does not appear anywhere in the claim. And nothing in the actual claim language—"applying a first function to each part of said first plurality of parts" (A11157)—precludes Kantor's approach, in which the hash function is applied to each constituent file ***before*** the files are placed in the zipfile. A7032-7033.

PersonalWeb also contends that Kantor's hash of the inner files is applied before the files are "compressed" and "the zip-file overhead added." Br.72. The Board was justified in rejecting this argument on multiple grounds, each of which independently supports its conclusion. The Board found that: (1) Kantor works with "zip files of all forms," not just compressed files (A218); (2) even if Kantor were limited to compressed zipfiles, compressing a file changes only its format,

not its content, and the open-ended claim language ("*comprises* a first hash function," A11157) allows for addition of a separate unclaimed compression function (A219-220); and (3) the presence of information in the zipfile apart from the inner files is irrelevant to the claim (A220-222). PersonalWeb does not respond to any of these findings, each of which is supported by substantial evidence.

3. PersonalWeb shows no error in the Board's obviousness analysis

PersonalWeb's only challenge to the Board's obviousness ruling regarding the '544 patent again turns on its assertion that the Board failed to sufficiently discuss each of the *Graham* factors (Br.76-79). The Board's decision regarding the '544 patent discusses the scope and content of the prior art and the differences between the prior art and the claimed subject matter (A222-224), as well as PersonalWeb's arguments concerning secondary considerations (A224-225). While the Board did not explicitly state the level of ordinary skill in the art in the '544 decision, it held that the "level of ordinary skill in the art is reflected by the prior art of record," and the record "reflects the knowledge level of a person with ordinary skill in the art." A194. PersonalWeb has not identified any reason why an express finding on the level of skill would have changed the Board's obviousness determinations. *Litton*, 755 F.2d at 163-164 (holding that a "specific finding on the level of skill in the art is not … required where the prior art itself

reflects an appropriate level and a need for [such] testimony is not shown"). Moreover, the Board's findings regarding the level of skill for the related '791 and '280 patents, *see supra* pp. 53-55, 59—which share the same specification as the '544 patent—may be applied to the '544 patent as well. It is also clear that the Board analyzed obviousness from the viewpoint of a person of ordinary skill. *See, e.g.*, A223. The Board's obviousness analysis thus satisfies this Court's substantive approach to the *Graham* factors. *MySpace*, 672 F.3d at 1263-1264.

V. THE CHALLENGED '539 PATENT CLAIMS

A. Substantial Evidence Supports The Board's Findings That The Claims Are Invalid On Multiple Grounds

The challenged '539 patent claims (claims 10, 21, and 34) are also lengthy, but are directed to a few simple concepts. Claim 10, which is representative, focuses on the basic idea of using substantially unique identifiers for a data item, and for the segments within the data item, to obtain one of the segments. A15848(claim 10). The identifier for each segment is based at least in part on a function of the data in the segment (*e.g.*, a hash), and the identifier for the larger data item is based at least in part on a hash of the identifiers for the segments (*e.g.*, a "hash of hashes"). A15848(41:64-42:5). The claimed method uses the identifier for the data item to request and obtain a plurality of segment identifiers (A15848(41:61-62)), and then uses one of the segment identifiers to obtain a particular segment (A15848(42:6-12)).

The Board correctly found these claims invalid on multiple independent grounds. ***First***, the Board found that claims 10 and 21 are anticipated by Langer and that claim 34 (which adds the additional step of dividing the data item into segments) is obvious based on Langer in view of Woodhill. The Board found (and PersonalWeb did not dispute) that Langer discloses:

- a "data item" in the form of a "package" of "inner files," where the inner files correspond to the claimed "segments" of the data item;
- creating "segment identifiers" by applying an MD5 hash function to the inner files of the package; and
- creating a "first identifier" for the package by applying an MD5 hash function to the "concatenation of the codes of the inner files" (*i.e.*, a "hash of hashes").

A306. The Board also found that Langer discloses using the identifier for a package to obtain the "segment identifiers" for the inner files of the package, and then using the segment identifier for one of the inner files to obtain that file. A307 (citing A7002-7003); A309-310. The Board thus found that Langer discloses exactly the same file request protocol as claims 10, 21, and 34. A307; A309-310. With regard to claim 34, the Board ruled that Woodhill discloses the added step of dividing files into segments, and that it would be obvious to apply this technique to Langer to provide a more efficient method of handling large files. A314.

Second, the Board found that claims 10 and 21 are also obvious over Kantor, and that claim 34 is obvious over Kantor in view of Langer.[24] The Board found that Kantor discloses "segments" in the form of the inner files of a zipfile, and a "data item" comprised of the collection of inner files. A317-318; A321-322. The Board further found that Kantor discloses "contents signatures" based on hashes of the inner files in the zipfile ("segment identifiers"), and also discloses "zip-file contents signatures" based on a "hash of hashes" of the contents signatures of the inner files ("first identifier"). A317 (citing A7033). The Board also found that Kantor—like Langer and the challenged '539 patent claims—discloses determining whether a zipfile exists in the system using the zipfile contents signature ("first identifier"), and then determining whether an inner file of that zipfile is present in the system using the contents signature ("segment identifier") of that inner file. A317. Although Kantor generally discloses requesting and obtaining files based on file names, rather than contents signatures, the Board agreed with Dr. Clark that it would have been obvious to replace file names with contents signatures or zipfile contents signatures in download requests. A327. Accordingly, the Board found that claims 10, 21, and 34 are obvious over Kantor.

[24] With regard to claim 34, EMC relied on Langer to teach a cryptographic hash function in the event the Board accepted PersonalWeb's argument that the claim term "a True Name of the data" was construed as limited to use of a cryptographic hash function. A15126-15127. The Board correctly rejected PersonalWeb's construction, and thus Langer ultimately was not required to support the Board's obviousness determination for claim 34. A331.

Third, the Board also found claims 10 and 21 obvious over Woodhill's update request of a granularized file, in view of Fischer. As discussed above (p. 60), Woodhill's "granularization" technique involves dividing a binary object into "granules" and creating contents identifiers for the granules. A334-335. The Board found that Woodhill's binary objects are the claimed "data items" and that the granules are the claimed "segments." A334 (citing A7269(8:57-62, 8:40-42)); A336. Likewise, Woodhill's Binary Object Identifier for the binary object is the claimed "first identifier," and Woodhill's "granule contents identifier" is the claimed "segment identifier." A337. The Board also found that Woodhill discloses the data item request protocol of the '539 patent because Woodhill's "update request" protocol involves using a Binary Object Identifier (first identifier) to obtain a plurality of granule contents identifiers (segment identifiers), and then using the granule contents identifiers to obtain the granules (segments). A335-337 (discussing A7274(17:27-18:9)). Finally, the Board agreed that the claim requirement that the first identifier be a function of the segment identifiers was satisfied by the well-known hash-of-hashes technique disclosed in Fischer. A338-342. The Board also credited Dr. Clark's testimony that it would have been obvious to combine Woodhill with Fischer, because it is more efficient to calculate the identifier for a large database of files using a hash of hashes. A338 (citing A16199-16200(¶59)); A339; A342. Thus, the Board found that all the

requirements of claims 10 and 21 were obvious over Woodhill in view of Fischer. A342.

B. PersonalWeb's Arguments Lack Merit

1. Substantial evidence supports the Board's finding that Langer does not disclose separate and distinct embodiments

PersonalWeb conceded below—and does not dispute on appeal—that Langer discloses almost all the key features of the '539 claims:

> PersonalWeb does not disagree that: (1) Langer's package is a data item; (2) the individual inner files of a package are segments; (3) the MD5 codes of the inner files are the segment identifiers; and (4) an MD5 code of the concatenation of the codes of the inner files from the package is the first identifier.

A306 (citing A15390); *see also* A15391 (PersonalWeb conceding that Langer discloses accessing a file using an MD5 code). PersonalWeb attempts to invoke *Net MoneyIN* once again, however, by arguing (Br.63-64) that the Board combined purportedly "distinct standalone and packages discussions" in finding that Langer disclosed using a "first identifier" to request and obtain "segment identifiers" and a "segment identifier" to request and obtain a "particular segment." Again, however, PersonalWeb's attempt to avoid the substantial evidence standard of review of the Board's fact finding is without merit.

As the Board correctly found, Langer does not disclose alternative embodiments. A307-310. Rather, Langer first introduces the concept of using

"unique identifiers" (*e.g.*, MD5 hash codes) to access files. A307 (citing A7000-7002). An MD5 code can be created for, and used to access, any file in the system. A7000-7001; A2906-2907(Clark). Langer then explains how this technique can be applied and extended to what Langer calls the "related problem" of "packages" of files. A307-309; A7002-7003.

Moreover, the Board provided detailed analysis explaining how Langer uses the MD5 hash for a package ("first identifier") to obtain the MD5 hashes of the inner files of the package ("segment identifiers"). A307-310. Specifically, the Board credited Dr. Clark's explanation that Langer discloses using the MD5 hash for a package to obtain a listing of the MD5 hashes for the inner files. A309; A16178-16179; A7002-7003. The Board also found that using the package's identifier to obtain the identifiers for the inner files is essential to allowing the user to download only those inner files that have changed "***without the need for collecting the entire package***." A308; A7002. The Board thus found that PersonalWeb's argument that Langer disclosed distinct standalone and package embodiments was "contrary to Langer's stated objective for his invention" and "contradict[ed] Langer's explicit disclosure." A308. Accordingly, *Net MoneyIN* is again inapposite, because substantial evidence supports the Board's finding that Langer does not disclose separate and distinct embodiments or protocols, but rather

discloses an "overall concept" and builds upon that concept in its solution to a "related problem." A307-309.

Finally, even if the Board had been required to accept PersonalWeb's reading of Langer (which it was not), any error is clearly harmless, because the Board also found the challenged '539 patent claims obvious on ***multiple other grounds***—Langer combined with Woodhill, Kantor (alone or combined with Langer), and Woodhill combined with Fisher. A361. PersonalWeb has not appealed these alternative invalidity holdings, aside from its general complaint about the Board's application of the *Graham* factors, addressed below.

2. PersonalWeb shows no error in the Board's obviousness analysis

PersonalWeb also incorrectly argues that the Board did not adequately articulate its analysis of the *Graham* factors in its determination of obviousness for the '539 patent. But as with its other obviousness decisions (*see supra* pp. 53-55, 59, 66-67), the Board appropriately considered and addressed all four *Graham* factors in its obviousness analysis. The Board considered: the scope and content of the prior art and the differences between the prior art and the claimed subject matter (A310-312; A316-327; A327-332; A333-339); the reasons to combine prior art references (A313-314; A328; A339-342); and PersonalWeb's arguments concerning secondary considerations (A314-316; A327; A332; A342).

While the Board did not explicitly state the level of ordinary skill in the art in the '539 decision, the Board expressly found that "the level of skill in the art is reflected by the prior art of record." A304. Any error here is harmless in any event, as PersonalWeb has not identified any reason why a finding regarding of the level of skill would have affected the Board's obviousness determinations. *See Litton*, 755 F.2d at 163-164; *supra* pp. 54-55. Moreover, the Board clearly analyzed obviousness from the viewpoint of a person of ordinary skill. A304. Indeed, the Board's decision made multiple express findings regarding what the prior art would have taught a skilled artisan. *See, e.g.*, A308-309; A313; A324; A326; A327; A341; A359.[25]

Accordingly, the Board's obviousness analysis for the '539 patent satisfies this Court's approach to the *Graham* factors; PersonalWeb's formalistic argument should be rejected. *See*, *e.g.*, *MySpace*, 672 F.3d at 1263-1264; *Litton*, 755 F.2d at 163-164.

VI. THE CHALLENGED '096 PATENT CLAIMS

A. Substantial Evidence Supports The Board's Findings That Claims 1, 2, 81, And 83 Are Obvious Over Kantor And Satyanarayanan

The challenged '096 patent claims (like the '544 and '539 claims) are long and appear complicated, but they are straightforward. Claim 1, for example,

[25] In addition, the Board's findings regarding the level of skill for the related '791 and '280 patents, *see supra* pp. 53-55, 59—which share substantially the same specification as the '539 patent—may be applied to the '539 patent as well.

requires: (1) determining "data identifiers" for each of two data items and "part identifiers" for each of their respective parts; (2) storing the parts of each data item on multiple servers (often called "mirroring" (A25534)); (4) storing "mapping data" to map the data identifiers to the part identifiers, and to map the part identifiers to the mirrored servers where the parts are stored; and (5) attempting to access at least one part of a data item using the identifiers and mapping data. A25196-25197(claim 1).

The Board correctly found that the challenged claims are obvious over Kantor in view of Satyanarayanan. A464-482. The primary dispute before the Board concerned the nature of Kantor's zipfiles. A466-470. As both parties agreed, Kantor's zipfiles include both "inner files" (*i.e.*, the content data in the zipfile) and metadata (*i.e.*, data about the inner files, such as file names, directories, time, dates, and other administrative information). A468; A28512-28513. The specific issue before the Board was whether the relevant "data item" in Kantor must be the entire zipfile including the metadata (as PersonalWeb argued), or instead may simply be the portion of the zipfile consisting of the inner files—*i.e.*, the content portion of the zipfile (as EMC argued). The Board agreed with EMC, finding that the relevant "data item" in Kantor need not be the entire zipfile including metadata, but rather may be the set of inner files within the zipfile. A466-467. As the Board explained, this finding was supported by the patent's own

definition of "data item" (A25178(2:16-21)) and PersonalWeb's agreed-to construction that a "data item" can be a "portion" of a file (A462). A466-467.

The Board further found that Kantor discloses "contents signatures" for each of the inner files in the zipfile based on a hash of the contents of the inner file ("part identifiers") and "zipfile contents signatures" for the set of inner files within the zipfile based on a "hash of hashes" ("data item identifiers"). A465 (citing A7030-7032; A7072-7073(Kantor); A25551-25552(¶87)(Clark)). The Board also found that Kantor discloses "mapping data" to map the zipfile contents signatures for a given set of inner files to the contents signatures for each inner file, and Satyanarayanan further discloses mapping files to a server where the file is located. A471; A466. The Board further found, relying on Dr. Clark's declaration, that it would have been obvious to modify Kantor's protocol for identifying parts of files in the system to then "access" the files (or parts of files) that have been identified. A475-477; A25549-25550(Clark); A7008-7010; A7029; A7033; A7229-7230(Kantor).

Although Kantor uses contents signatures to identify copies of files within a system (A466), Kantor does not explicitly disclose replicating copies of files on multiple servers (*i.e.*, mirroring). As PersonalWeb's expert acknowledged, however, mirroring technology was well-known. A475 (citing A27902-27903). The Board therefore found that it would have been obvious to combine Kantor

with the mirroring system of Satyanarayanan. A466. In making this finding, the Board credited Dr. Clark's testimony that the combination was obvious because replicated storage (mirroring) provides a reliable storage system. A466 (citing A25550-25551(¶84)). Moreover, as Dr. Clark explained, it would have been obvious to use Kantor's "contents signatures" as the "unique" identifiers discussed in Satyanarayanan. A25557-25558(Clark); A21554.

B. PersonalWeb's Arguments Lack Merit

1. Substantial evidence supports the Board's finding that Kantor's sequence of inner files in a zipfile is a "data item"

PersonalWeb (Br.46-52) contends that the Board incorrectly construed the "data item" limitation of the '096 patent claims—*i.e.*, "the data item consisting of a sequence of non-overlapping parts." PersonalWeb argues that the Board should have construed "sequence of non-overlapping parts" as a sequence of non-overlapping parts ***that also has no "intervening" parts***. The Board correctly rejected PersonalWeb's attempt to rewrite the claim language to add this additional limitation. A469-470. Because the Board's construction was based on underlying findings of fact, it is entitled to deference. *See Teva*, 135 S. Ct. at 837-838.[26] The

[26] Specifically, the Board's interpretation of "sequence" was based in part on its credibility determination regarding Dr. Clark's testimony as to the meaning of "sequence" to a person of ordinary skill in the art at the time of the invention. *See* A467-468(citing A25551, A25556(¶¶86, 100)); A469(citing A19786).

construction was correct under any standard, however, and PersonalWeb's attempt to rewrite the "data item" limitation fails for multiple independent reasons.

First, PersonalWeb's argument that the "data item" in Kantor must be the "sequence" of "***all*** of the data" in the zipfile (Br.51) is directly contrary to the Board's construction of "data item." *See* A462. Specifically, the Board construed a "data item"—consistent with the lexicography in the patent and the parties' agreement—as "any … entity which can be represented by a sequence of bits" including, among other things "a ***portion*** of a file." A462 (quoting A25178(2:16-21) (explicitly defining a "data item" to include "a portion of a file")). PersonalWeb does not (and cannot) dispute that the inner files of a zipfile are "a portion of a file"—as the Board correctly found. *See* A467; A28510-28511.

Second, PersonalWeb attempts to argue (Br.46) that, because the data item must consist of a "sequence of non-overlapping parts" and each part must consist of a "corresponding sequence of bits," the data item cannot include some of the bits in the zipfile (the inner files) and exclude other "intervening" bits (the metadata). The Board correctly rejected this interpretation of "sequence" as contrary to the plain meaning of the term. A469-470. As Dr. Clark confirmed, and the Board agreed, there are many common examples of sequences with "intervening gaps," such as a sequence of even numbers, which excludes intervening odd numbers. A19880-19881; A28511. The broadest reasonable

interpretation of "sequence" thus encompasses sequences with intervening gaps, as the Board correctly found. A467; A469-470; *see also* A25200(45:30-32) (claim 83: claiming data items consisting of an "arbitrary sequence" of bits (*i.e.*, a sequence with intervening gaps)).[27]

Third, PersonalWeb incorrectly interprets the claim language referring to the data item "consisting of" a sequence of non-overlapping parts. Br.50-51. There is no dispute that "consisting of" typically signifies restriction and exclusion. But the larger claim phrase—a "data item consisting of a sequence of non-overlapping parts, each part consisting of a corresponding sequence of bits"—does not exclude intervening parts (*i.e.*, does not require that the sequence have no gaps), as PersonalWeb argues (Br.46). Instead, it simply excludes ***overlapping*** parts. Moreover, PersonalWeb's reasoning is circular. PersonalWeb appears to argue that, if the "data item" is a zipfile, then the data item must "consist of" all the data in the zipfile. *Id.* But the Board ***rejected*** PersonalWeb's argument that the "data

[27] PersonalWeb's argument (Br.49) that a "sequence of non-overlapping parts" cannot have intervening "non-parts" is also directly contrary to the patentee's use of the term "sequence" in the '096 specification. Specifically, the '096 patent explains that a "pathname" can include a "***sequence*** of zero or more ***directory names*** identifying nested directories." A25180(5:55-59). Under PersonalWeb's proposed construction of "sequence," there could be nothing between the sequence of directory names in a pathname. Br.49. But it is undisputed that the sequence of directory names in a conventional pathname is separated by "intervening" slashes, such as the slashes in http://www.cafc.uscourts.gov/opinions-orders/search/report.html. *See, e.g.*, Br.4 (providing a similar example of a pathname as discussed in the patent).

item" is the zipfile. A467. Because the relevant "data item" is the set of inner files (as the Board correctly found, A467), the "data item" consists of all the data in the inner files.

Fourth, PersonalWeb's argument that the "data item" claimed in the '096 patent must be read to include the metadata of a zipfile (Br.51) is directly contrary to the stated purpose of the invention and would force a construction that would exclude the preferred embodiments. A468-469. In particular, the stated purpose of the '096 patent is to create an identifier based on ***all*** the data and ***only*** the data—and independent of metadata (such as file name and location). A468. Indeed, both the '096 patent and Kantor expressly disclose using content identifiers that are independent of metadata. *Compare* A2541(3:33-35) ("[T]he identity of a data item is ***independent of its name, origin, location, address, or other information not derivable directly from the data*** ….") *with* A7009(Kantor) ("[A] 'zipfile contents signature' … is ***independent of*** … ***zipfile name, zipfile date,*** … ***the names and dates of files in the zipfile,*** [***and***] ***zipped path information*** ….").

Moreover, as both parties' experts confirmed, the '096 patent intentionally does not hash metadata about the contents of the data item. A28512(¶11); A27836-27841; A27850-27851(Dewar). This independence of the identifier from metadata is critical because, if the identifiers were based in part on the metadata, the identifiers would change whenever the pathname, directory, time of last access,

or location changed, even though the actual contents did not change, contrary to the very purpose of the invention. A28512(¶11); A27836-27841; A27850-27851(Dewar). PersonalWeb's expert further admitted that the independence of the identifier from the metadata is a "fundamental property" of the invention. A27839-27841.

Accordingly, substantial evidence supports the Board's finding that Kantor's sequence of inner files in a zipfile is a "data item." PersonalWeb fails to identify any error in the Board's construction of "a data item consisting of a sequence of non-overlapping parts." Nor has PersonalWeb shown that the Board clearly erred in relying on the declaration of Dr. Clark regarding the meaning of "sequence" to a person of ordinary skill in the art. *See Teva*, 135 S. Ct. at 837-838.

2. PersonalWeb shows no error in the Board's obviousness analysis

With regard to obviousness, PersonalWeb repeats its argument regarding the construction of "sequence of non-overlapping parts" and its general assertion that the Board failed to discuss each of the *Graham* factors sufficiently. Br.76-79. PersonalWeb's claim construction argument is refuted at pages 77-81 above.

In addition, as in the other decisions on appeal, the Board appropriately considered and addressed all four *Graham* factors in its obviousness analysis for the '096 patent. The Board began by discussing all four *Graham* factors and explained that its obviousness analysis applied those principles. A463-464. The

Board then considered the scope and content of the prior art and the differences between the prior art and the claimed subject matter from the perspective of a skilled artisan. A464-482. Indeed, the Board made multiple express findings regarding what the prior art would have taught to a skilled artisan, based on the testimony of the experts and the level of skill reflected by the prior art. *See, e.g.*, A466; A469-470; A473; A475-477; A478; A479; A483-484.[28] The Board also considered and rejected PersonalWeb's arguments concerning secondary considerations, because PersonalWeb failed to show sufficient nexus between its proposed secondary considerations and the challenged '096 claims. A480-482. PersonalWeb has not appealed those findings.

Finally, PersonalWeb has not identified any reason why a specific finding regarding of the level of skill would have changed the Board's obviousness determinations for the '096 patent. Br.73-79. And PersonalWeb's unexplained assertion that the Board's obviousness analysis was "conclusory" (Br.79) ignores the Board's extensive analysis, which spanned nearly 20 pages (A464-480).

The Board's obviousness analysis was thus more than sufficient. *See, e.g.*, *MySpace*, 672 F.3d at 1263-1264; *Litton*, 755 F.2d at 163-164.

[28] Moreover, the Board's findings regarding the level of skill for the related '791 and '280 patents, *see supra* pp. 53-55, 59—which share substantially the same specification as the '096 patent—may be applied to the '096 patent as well.

VII. THE CHALLENGED '662 PATENT CLAIM

A. Substantial Evidence Supports The Board's Finding That Claim 30 Is Obvious Over Kantor And Satyanarayanan

The challenged '662 patent claim—claim 30—is directed to using content-based identifiers to delete data items. A20980. Claim 30 describes a "computer-implemented deletion method" that includes: (1) "obtaining a particular digital data item identifier of a particular data item … in response to an attempt to delete [the] data item" and (2) "updating a record … to reflect deletion of [the] data item." A20980.

The Board correctly found that claim 30 is obvious over Kantor and Satyanarayanan. A404. In particular, the Board found that Kantor describes a method to "clean up" a bulletin board system by identifying and deleting duplicate files using contents signatures for the files. A396 (citing A7072-7073(Kantor)); A398-399 (citing A7213(Kantor)). The Board explained that "Kantor obtains a data item identifier in response to an attempt to delete, per claim 30" by issuing a "MULTIS" command, which obtains the contents signatures for the duplicate files (data items) to be deleted. A398-399 (citing A7213(Kantor)). The Board also found that Kantor "update[s] a record" to reflect deletion by placing a "d" indicator to indicate the record's status as deleted. A400 (citing A23469-23470(¶19)); A7213(Kantor).

In addition, just as with the ’096 patent, the Board agreed with Dr. Clark that it would have been obvious to combine the contents signature management system of Kantor with the replicated storage (mirroring) system of Satyanarayanan, because it was well known in the art that replicated storage provides a reliable storage system. A397.

Accordingly, the Board correctly found, based on the evidence of record and Dr. Clark’s analysis, that a skilled artisan would have found it obvious to combine Kantor and Satyanarayanan to produce claim 30 of the ’662 patent. A404.

B. PersonalWeb Shows No Error In The Board’s Obviousness Analysis

PersonalWeb does not challenge ***any*** of the Board’s factual findings in support of the ’662 patent’s obviousness. Instead, PersonalWeb again incorrectly argues (Br.76-79) that the Board did not adequately articulate a *Graham* analysis. As with the other patents-at-issue, the Board’s analysis of the ’662 patent properly considered each of the *Graham* factors. A394-404. The Board began by discussing all of the *Graham* factors and explained that its obviousness analysis applied those principles. A394-395. The Board also discussed the requirements of claim 30 (A390-392) and properly compared them to the disclosures in Kantor and Satyanarayanan from the perspective of a skilled artisan (A394-404). The Board also made multiple express findings regarding what the prior art would have taught a skilled artisan, relying on the testimony of the experts and the level of skill

reflected by the prior art. *See, e.g.*, A394-395; A397; A400; A402. Finally, the Board considered and rejected PersonalWeb's arguments concerning secondary considerations, because PersonalWeb failed to show sufficient nexus between its proposed evidence of non-obviousness and the challenged '662 claims. A402-404.

PersonalWeb ignores this extensive obviousness analysis and simply asserts—without any explanation—that the Board's analysis was "conclusory." Br.79. But PersonalWeb does not even attempt to identify ***any*** substantive error in the Board's obviousness analysis for the '662 patent. Br.73-79. PersonalWeb also has not identified any reason why a specific finding regarding the level of skill in the art would have changed the Board's obviousness determination for the '662 patent.[29]

Thus, as with all of the patents-at-issue, the Board's obviousness analysis was more than sufficient. *MySpace*, 672 F.3d at 1263-1264; *Litton*, 755 F.2d at 163-164.

CONCLUSION

The Board's decisions should be affirmed.

[29] Moreover, the Board's findings regarding the level of skill for the related '791 and '280 patents, *see supra* pp. 53-55, 59—which share substantially the same specification as the '662 patent—may be applied to the '662 patent as well.

Respectfully submitted,

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February 27, 2015

CERTIFICATE OF SERVICE

I hereby certify that, on this 27th day of February 2015, I filed the foregoing BRIEF FOR APPELLEES EMC CORPORATION AND VMWARE, INC. with the Clerk of the United States Court of Appeals for the Federal Circuit via the CM/ECF system, and served a copy on counsel of record via the CM/ECF system.

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February 27, 2015

CERTIFICATE OF COMPLIANCE

Pursuant to Fed. R. App. P. 32(a)(7)(C), the undersigned hereby certifies that this brief complies with the type-volume limitation of Fed. R. App. P. 32(a)(7)(B) and Federal Circuit Rule 32(b), as modified by this Court's order dated October 15, 2014.

1. Exclusive of the exempted portions of the brief, as provided in Fed. R. App. P. 32(a)(7)(B), the brief contains 18,893 words.

2. The brief has been prepared in proportionally spaced typeface using Microsoft Word 2010 in 14 point Times New Roman font. As permitted by Fed. R. App. P. 32(a)(7)(C), the undersigned has relied upon the word count feature of this word processing system in preparing this certificate.

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